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THROUGH CANADIAN WILDS

By Ellwood Wilson

A FORESTER'S life is not all beer and skittles. People say so often, "Oh! if I could only lead the free, open air life which you lead, next to nature, far away from the confined grind of the city!" But take these same people and give them the forester's daily life for three or four weeks, even under the best conditions, and see how quickly they would tire of it. This is especially true under the conditions which exist in the Canadian forests today. There are no roads or trails and a man's outfit must be carried on his back and by canoe in summer, and on a toboggan which he pulls in winter. The forests are a long way from the settlements, from thirty to one hundred and fifty miles, and there is no communication, so that letters and news of the outside world are few and far between. One sleeps in a tent at all seasons of the year and travels and works in all weathers. The three main divisions of the year are winter, from first of November till the first of May, fly time, from May fifteenth to first of August and fall. Fly time is the worst of all, as the flys, mosquitoes and gnats make life almost unendurable. With proper outfit and reasonable care the hardships are not great and after once getting broken into the life there is a great fascination in it.

One of the hardest times of the year is the latter part of November, before the ice on the lakes is thick enough to bear a man's weight and too thick to break a way through for a canoe. As all travel is by way of the lakes and rivers, both in summer and winter, and the portages are only cut through the woods from one water way to another, when lakes cannot be crossed it is exceedingly difficult to go around them. One year, having a party in the woods surveying and estimating timber, I started about the middle of November to inspect their work and to take in the small sheet iron stoves which are used in the tents in winter and also snowshoes and mail. With me was a man who had never worked in the woods in the north before but who wanted to get the experience and who was to remain with the party. We started from our headquarters on a clear crisp day and drove in with our duffle loaded on a buckboard to the end of the road, about twenty-four miles to the depot of one of the lumber companies which lies at the foot of Lac Mistagance, a lake about twelve miles long. Here we put our birch bark canoe in the water and loaded up, with not much room to spare. A steady uneventful paddle brought us to the end of the lake and our stuff was unloaded and piled on the bank while we crossed the two mile portage to the next lake where our Company had a depot, the last outpost of civilization. Here we sent back a horse for our load and while it was being brought up we got together our provisions for the trip into the woods.

Bright and early the next morning we were off, taking with us an extra

A RANGER'S TENT IN WINTER—WITHOUT ALL THE COMFORTS OF HOME

canoe and two men to help us over the "Long Portage," seven miles. The weather was perfect and as we made the two short portages and crossed the two long narrow lakes to the beginning of our real day's work, it seemed good to be alive and the loads we carried only lent a zest and helped to keep us down to earth. Leaving one canoe at the beginning of the "Long Portage" for the packers to return in, we started out, stopping for lunch after a mile or so. We shot two or three grouse with our pistols, keeping them for our breakfast. About half past five we reached the other end and pitched our small Baker tent, spreading it to give some shelter to all four of us and after a hearty supper, were soon asleep.

In the morning we said good-bye to our packers and launching our canoe on the River Mattawin, a beautiful stream about seventy-five miles long and with many picturesque rapids, we started upstream. We had three portages and had to "double" them as our load was too heavy to be taken over in one trip. Just before noon we reached the mouth of the Chienne River, a smaller stream emptying into the Mattawin, up which our route lay. Here we had lunch and after passing through two small lakes, where the river widened out, we found the water quite low and had to track our canoe through several swift waters. About four o'clock we made a short portage into Lac Brochet and to our great surprise found it frozen. This was something of a dilemma as we did not relish the thought of having to pack all our baggage around it and if it had frozen so early, many of the other lakes above would probably be frozen too. Trying the ice with our axes, and finding it fairly safe, I crossed by lying flat on my stomach so as to cover as much ice as possible and by tying four tump lines together we dragged the duffle across the narrow bay. Here we made a camp and as the night was clear did not trouble to put up a tent but crawled into our sleeping bags and were soon lost to the world. About three in the

A JOBBER'S CAMP IN THE HEART OF WINTER

morning I remember feeling chilly but was too sleepy to really wake up. When I did, I felt the most delicious warmth and as it did not seem very light I lay there enjoying the sensation for a few minutes, then throwing aside the blankets looked out and found that about eight inches of snow had fallen in the night and completely buried us.

My man complained of feeling sick, but as he had no temperature and his pulse was good I was rather inclined, especially after I saw the breakfast which he ate, to think it only a case of "cold feet." However, we decided to stay in camp for the day and leaving him in his bag, I pitched the tent, cut some boughs for beds and wood for the fire and packed our loads so that they would be easy to carry and spent the afternoon taking them as far up the lake as I could without running into bad going. The ice on the lake would not bear and as it seemed to be getting colder the ice would probably be much thicker in the morning.

Next day, the invalid feeling better, we loaded our camp outfit into the canoe and hitching a tump line to the bow, one of us dragged it from in front, the other pushing behind, we went to the place where I had taken the duffle and loaded that in too. In case the ice gave way we expected to jump into the canoe. Nothing happened and we reached the other end of the lake. There the portage, about two miles long went right up the mountain in order to pass a beautiful fall, nearly sixty feet high. As we were heavily loaded and it was probable that we should find the next lake frozen, I took the snowshoes and a stove for our two loads, leaving the canoe for the second trip. There was about eight inches of snow and the going was pretty hard. When we reached Lake Virginia we found it partly frozen, and as the next

lake was long and narrow, being sheltered by high hills, we were sure it would be frozen too. The place where we expected to find the men camped was only five miles away in a straight line and I decided to push on and join them and bring back enough men to take all the baggage up in one load.

It had begun to snow again quite heavily and as the survey line we wanted to follow in order to take the most direct route ran up over a high cliff we started to go around it. After travelling about fifteen minutes I saw what I thought was the creek which ran out of the next lake above and we went down so as to find easier walking on its frozen surface. After following it for about one hundred yards we passed a place where the ice was thin and I noticed that the water was running the wrong way. This is a very uncanny sensation in the woods and it is hard to make one's self believe the evidence of one's senses. I realized however that in the fog and snow I had made a circuit and come back to the very creek from which we had started. Beginning again and with more care in travelling we reached the next lake and ate a couple of hardtack which we had brought for lunch.

The line we were following went right up the side of a mountain now and my companion was travelling so slowly, not being accustomed to the woods, that I told him to follow my trail and I would push on ahead. Coming to a little creek, I saw a grouse and tried, but without success, to get him with my pistol. About four o'clock we reached a small marshy lake and in crossing it I went through the ice up to my armpits. Crawling out and on shore, I stripped off my clothes and wrung them out as dry as possible and although they felt pretty chilly, started off again as we were anxious to reach the camp before it was too dark. The going was very rough and I had to wait several times for my man, so that it was seven when we reached Lac Crapaud, a small lake about three hundred yards from Grand Lac Chienne, at the head of which the men were camped.

Crossing the portage to the big lake, we found it open, so fired several shots and called, in the hope that some one in the camp would hear us and come for us with a canoe. There was quite a wind blowing and we heard no answer, so started along the shore in the dark for camp. There was no trail and the going was very bad. After about half an hour, however, we reached the long sandy beach at the head of the lake and with a sigh of relief went to the camping place. We had been talking all afternoon of the supper we would have, for the cook was famous, so that you can imagine our surprise when we found no sign of a camp. Only the empty fireplace of stones and the table of rough hewn logs.

I looked everywhere for a note or some sign to tell us where the men had moved but there was absolutely nothing, and it was hard to see anything in the dark. We made up a fire and built a rough lean-to of boughs, and a pile of them to sleep on and curled up close to the fire and were soon asleep. I woke up after a splendid night's sleep to find my companion shivering over the embers of the fire, the poor chap had not slept a wink and again complained of feeling ill. I sat down on a log to pull on my boots and as one side of me seemed rather chillier than the other I felt of my breeches only to find that I had slept too close to the fire and had a hole as big as my two hands burnt right through my heavy mackinaws. After making up a good fire I looked all around for a note or some sign which might tell us where the camp was, but in vain. No birch bark note, as was usual, had been left and the snow had effectually covered all tracks.

Food was of course the first consideration and I searched thoroughly to see if a cache had been left but found nothing. Then I remembered that on the western shore of the lake an old Indian had a tepee where he spent part of each year hunting and I tramped around the shore in the snow to it, but found nothing eatable, only a few old cooking utensils.

A RANGER'S PACK TRAIN IN THE MOUNTAINS IN THE SUMMER TIME

There were two ways that the men might have gone but either one meant making the circuit of several large lakes and the probability was that the camp would be at least a full day's trip had we been able to cross the lakes and much more than that under present conditions and no certainty of finding them at the end of the trip and, in that case, without food, we should have been in a bad way. I decided therefore to return by the way we had come to Lac Brochet and we reached a woodcutter's camp there about five o'clock hungry enough to have eaten everything in the shack. It was a filthy place, about fifteen by twelve feet, with a stall for a horse across one end, a couple of bunks, one above the other, along the side, a rough table, with a few dirty dishes, in front of the only window, a pane of glass about fifteen by twenty-four inches, and a stove and bench. Being too tired to pitch a camp we spread our sleeping bags on the floor beside the horse and were soon dead to the world.

Next morning we left the stoves, snowshoes, mail and other things we had brought for the men, with the jobbers knowing that the men would send to a cache nearby for provisions before very long. Then taking our canoe we started for home, as my companion refused to undertake the trip up again and then and there resigned his job. Our trip down the Chienne river was quick until we reached the first small lake and this and the next one we found completely frozen over. It took us until three in the afternoon to break our way through these and we reached the Mattawin River about half past four and found this frozen too solidly to admit of any further canoeing.

We thereupon cached our canoe on a staging built on four trees and taking our provisions and sleeping bags started down the river for an old log camp where we had noticed a stove and some provisions on the way up. This we reached, pretty well fagged out about seven. We found that the stove we had noticed had no pipe, so turning it upside down and proping it up on four stones we made a fire and had some supper, losing no time afterwards in getting into our bags. There was a small room off the large one with two bunks in it and my man took the upper while I spread my bag on the floor. Some time in the night I was roused by wild cries of fire, and getting out of my bag, I found that the stove had gotten red hot and set fire to the floor which was burning merrily. We soon had this out and returned to our couches. In the morning we congratulated ourselves that my man had taken the upper bunk, because the smoke had awakened him, and right beside the bunks we discovered two full boxes of dynamite.

As it was snowing heavily we spent the next morning making two small sleds out of barrel staves so that we could drag our baggage over the ice instead of carrying it. Next morning we crawled across the river, dragging with us long poles in case the ice should break and started down. I tried to persuade my companion to keep a little away from the shore where on account of the shallower water the ice was not so thick, but he would not and twice that morning we had to build a fire to dry him out. We had lunch on the end of the "Long Portage" and tried to use our snowshoes in the afternoon but the snow was very soft and sticky and my companion, being unaccustomed to them, made very slow progress. We camped that night about halfway over and were glad of the rest for trudging through a foot of snow with a pack is no fun.

By next morning we had another three inches of snow and I fairly had to drive my man out of his blankets. All day we plodded along making only about four miles. Soon after breakfast next morning we reached Lac Prudent, the end of the portage and found an old scow frozen in the ice of the small bay, but the rest of the lake as far as we could see was open. We started in to cut out the scow, which took over two hours as we had to cut a regular channel through the ice, and putting our stuff on board we went down the lake, stopping at a deserted driver's camp where there was a stove. Here we had a good supper and a good

RANGER IN CANOE ON THE RIVER MATTAWIN

night's rest. In the morning we started with the scow, but the wind was so strong and our makeshift oars so inefficient that it was noon before we reached the lower bay, and finding this frozen too thickly to break we stopped for lunch.

We made a couple of light sleds for our baggage and skirting the shore, as the ice was barely thick enough to hold us, we reached the end of the lake and crossed the portage, arriving at Lac Marcotte about four thirty. This had all frozen over since we crossed it on the way up and as there was a good camp just across the bay, about three-quarters of a mile off we were anxious to reach it so that we would not have to pitch the tent. I tried the ice with a pole and finding it pretty thick cut several holes with my ax to a point about one hundred feet from shore and found it safe. Going back for my pack, I told my companion to remain about two hundred feet behind me in case anything happened and off we started.

I had gone about six hundred feet from the place where we went on to the ice and was about three hundred feet from the nearest shore when all of a sudden without any warning the ice seemed to give way in all directions dropping me into the freezing water. I was dragging my sleeping bag on a sled and this was floating near me. I swam to the edge of the ice nearest to the shore and tried very carefully to get up on it, but it was too thin. I tried this in several places, breaking the ice in front of me toward shore in the hope of finding a place where it would bear me. I had called to my man as soon as I went in and he had gone back to shore and cut a long pole which he slid out to me. This I placed across the narrowest part of the break and got almost out on the ice when it broke again and down I went headfirst into the water. I was getting so chilled now that I could hardly swim so I made for my sleeping bag and with that to hold me up swam to the ice nearest shore. Sliding the bag under my chest I tried to work myself out on to the ice and got my whole body on it with only my feet on the bag and was just congratulating myself on my success when the

THE KIND OF TRAIL THE FOREST RANGERS SOMETIMES HAVE TO CLIMB

A FRENCH CANADIAN JOBBER

ice gave way again and down I went. On coming up I was so numb that I took a turn of my tump line around my body in case I should lose consciousness. I did not know how I was ever going to get out and was childishly angry at not being able to, and at the thought of having to drown.

Twice my man had started out on the ice after me but I had made him go back, realizing that if he went in we should both drown. I called to him to cut a long, dry pole and to tie three tump lines to it and slide it out to me. I got hold of this and lying on my bag and breaking the ice in front of me he drew me to a point where the ice was thick enough to crawl on. By now, twenty-five minutes after my first plunge, I was very numb and to cap the climax when he came out to help me, about fifteen feet from shore we both went in again, but fortunately only up to our chests. After getting out I completely lost consciousness but he told me that I could walk and insisted on going back to the camp where we had spent the night before and he had to forcibly drag me on shore.

When I came to I was sitting naked on a log in the snow being rubbed with a dish towel. He had some dry underwear in his duffle bag and this we put on and as I had had all the matches and they were of course wet, we gnawed a piece of hard tack and both crawled into his sleeping bag. At least half a dozen times in the night he waked me up, saying "for God's sake let me turn over."

When we woke in the morning our clothes were frozen solid and my breeches were standing up just as though there was a man inside of them. Having slept with the matches under my armpit they were quite dry and we soon had a good fire and some breakfast, although as most of the provisions were in my pack, we had to be satisfied with corn meal mush and some bacon. The night had been cold and the scene of the accident was completely frozen over and we cautiously crawled out and chopped out my sleeping bag and pack. My ax and camera with all my pictures had sunk. We crossed the bay and finding the rest of the lake open had to skirt the shore, reaching the depot about three in the afternoon none the worse for the adventure.

FOREST WASTE CAUSES FAMINE

By President John T. Procter
Baptist College, Shanghai

CHINA'S life-sapping famine, in which millions are suffering, is largely traceable to the wasting of the forests. One of the most horrible tragedies of the world might have been prevented by the careful use of these resources.

"China's hills and mountains are deforested. This is particularly true in the hilly country drained by the Yangste river, whose valley comprises the stricken district. The river brings the soil down with it. That is the reason why we have the Yellow sea. For three hundred miles out from land the ocean is discolored by the silt brought down by the Yangste. The hills are washed bare of soil. There is some hunting in these hills, but the animals live among the brush. For want of better fuel the natives burn this brush.

"Last August the Yangste overflowed and flooded about 40,000 acres of densely populated territory. This flood placed a population of 3,000,000 in want. In fifty years there has not been such another flood. Some of the victims have been drowned out for two consecutive years, some three years, some four years. They not only have lost food, they have lost hope.

"Much of the land that was inundated is at sea level. It is drained by the most intricate system of canals in the world. I know of one city of 30,000 which is surrounded by canals. There are no roads to it, because a road could not go half a mile without touching a canal. There are not even footpaths. The people make their way to and from the city in boats. This is their only means of communication."

The movement for a woods products exposition in the United States is daily receiving encouragement and the outlook now is that one will be held within a short time. At such an exposition a great and varied line of manufactured lumber goods could be exhibited and an opportunity given for a very comprehensive exploitation of lumber and its manufactures.

Assistant District Forester A. C. McCain, who has been attending to matters relative to the division of the Humboldt National Forest, has returned to his station at Lamoille, Nevada.

F. N. Haines, formerly supervisor of the Blackfeet National Forest, has been endorsed for the position of Superintendent of Glacier Park, succeeding the late Major W. R. Logan, according to a dispatch from Kalispell, Mont.

The Bavarian Government has given much attention to fruit growing, a decree having been issued as early as 1769 requiring all land owners to plant fruit trees along the public highways bordering their estates. The systematic planting of such trees was begun about the middle of the last century. The value of fruit trees in Bavaria is now estimated at $170,000,000.

FORESTRY WORK AT SOUTHERN COMMERICAL CONGRESS

TWO forestry problems were handled at the Southern Commercial Congress recently held in Nashville. One involved the question of the management of large holdings of forest lands, and was considered at a conference with lumbermen. The other considered the farm forest and its relation to the farm and farmer. The lumbermen's conference was presided over by Mr. H. S. Graves, Forester of the U. S. Department of Agriculture. In addition to many of the largest lumbermen from some of the Southern States, there were present the State foresters of Wisconsin and New Jersey.

The dominant subject considered at the conference was the protection of forest lands, and especially of cut-over forest lands, from fire. The systems in use in several of the Northeastern and Lake States were discussed, and their applicability to Southern conditions; the cost of forest-fire protection; the relation of land owners, the local community, and the State to protection, and the distribution of the cost were all considered. It was shown that if protection could be secured, cut-over forest lands could be made a profitable investment for the production of timber. A great portion of the cut-over land is suitable for farming. It is possible, however, to produce a merchantable crop of young timber upon it before the labor conditions will permit its utilization for farming purposes.

Resolutions were adopted which called attention to the importance of the forest industries of the South. These industries, with their dependent industries, give employment to more than 400,000 men and yield annual products which amount to one billion dollars. The permanency of these industries is threatened on account of the unproductivity of the cut-over land which is largely the result of fires. The legislatures of the several Southern States were requested to appoint legislative committees to investigate the forest conditions and problems and to confer with committees of other States relative to desirable and uniform legislation having for its object the protection of forest lands from fire, the reduction of waste, and the adoption of methods of increasing the earning capacity of forest land. It was further urged that the States should make provision both for popular and technical education of farmers and other land owners in the methods of protecting and developing their forest land.

The farm forest meeting, which was conducted under the auspices of the U. S. Forest Service, was participated in by W. W. Ashe, Forest Service; Prof. Alfred Akerman, of Athens, Ga.; and Prof. J. A. Ferguson, of Columbia, Mo.

Planting forest trees on waste farm land was discussed by Prof. Akerman. He laid special stress on the choice of a species adapted to the site and the returns which can be expected from such plantations.

The management of old timber was discussed by Prof. Ferguson. He took up the necessity for making improvement cuttings in old stands, as well as liberation cuttings and reproduction cuttings, and the great opportunity that the farmer has for carrying on such work.

W. W. Ashe discussed methods of increasing the earning value of timber lands. With fire protection assured so as to preserve the fertility of the forest soil, the greatest returns must be expected from the management of young timber. As a rule the growth of stands of old timber is slow, or the stands are even stationary. Young stands respond to thinnings by making greatly accelerated growth. These thinnings should be so made as to concentrate the vigor of the soil in a comparatively few

FORTY-YEAR-OLD STAND OF SOUTHERN YELLOW PINE NEAR SAVANNAH, GA.

LUXURIANT FOREST GROWTH IN THE SOUTHERN APPALACHIANS

choice and thrifty trees. Such thin stands of second-growth pine, chestnut, red oaks, yellow poplar, and cottonwood will produce from 500 to 1,000 board feet of merchantable timber per acre a year. It is desirable to defer cutting young timber until the maximum yield per acre can be secured. It is equally as desirable to cut it before it has become old and its rate of growth has declined.

MR. GRAVES' ADDRESS

In opening the lumbermen's conference Mr. Graves made an address upon the problems which are to be considered in the South. He said:

"In any consideration of the industrial development of the South, the problems which stand out as most important are those connected with agriculture and forestry. We have met in this special conference to discuss forestry, a subject most intimately related in many ways to agriculture, but which is of such great importance in itself that it deserves separate consideration.

"The South is favored with climate and soil especially advantageous both for agriculture and for the production of forests. The original forest was characterized not only by trees of large size but by a great variety of species of peculiarly high quality and of value for widely diversified uses. The hardwood forests were unmatched in any land and the products of the coniferous forests now have a world-wide use.

"It is unnecessary for me to remind you of the important role played by the resources of the forest in the industrial upbuilding of the South. Suffice it to recall that the cut of lumber aggregates some 24 billion feet a year, or over half of that used in the entire nation. In addition to the lumber interests, other industries, such as the production of turpentine and rosin, the manufacture of wood pulp and paper, cooperage, tanning material, furniture, wooden ware, wagons and carriages, and the industries connected with wood distillation and wood preservation, bring the value of the products of the forests today to upwards of 550 million dollars. Louisiana stands now second in the production of lumber, being exceeded only by the State of Washington, while Mississippi, North Carolina, Arkansas, Virginia, and Texas follow in the order named, all leading the principal Northern and Western timbered States. I am told that the lumber industry of the South employs some 217,000 persons, and that the allied industries require over 200,000 more. We are therefore dealing with a problem of gigantic proportions and one which because of its magnitude is not of local importance merely but touches the welfare of the entire nation, and calls for the nation's full recognition.

"Originally the forests of the South covered over 220 million acres. The process of clearing land for agriculture began early in our history and extended rapidly throughout many sections of the South, so that today the total forest area has been reduced to some 150 million acres. This great area comprises a large amount of land which is susceptible of agricultural development as the forest is removed. It is of vital importance to the South that the land suitable to agriculture be devoted to that purpose and just as rapidly as possible be actually used for the growing of crops. That is the problem of those promoting the development of practical and scientific agriculture. There is, however, a vast area of land, some of it in great blocks in the mountains and elsewhere, and some in small patches within the agricultural areas, which is suited only to the growth of trees. It is estimated that this aggregates some 100 million acres. The problem of forestry concerns primarily this area, which is of such a character that it should be continued in productive use for growing timber.

FORESTS AND FLOODS

"From an economic standpoint we must recognize that forests render service to the public not only through the production of timber for use and the maintenance of important industries engaged in the manufacture of these products. In the case of many forests important benefits are derived from their action in preventing erosion and

A THING OF BEAUTY AND A JOY FOREVER—IF THE HEADWATERS ARE PROTECTED

LOGGING TULIP POPLAR IN APPALACHIAN FOREST. HAULING LOGS TO THE WATERWAY BY OXEN, NORTH CAROLINA

tending to maintain the regularity of stream flow. A great deal of confusion has been prevalent regarding these functions of the forest. Many persons point to great floods like those we are now having and insist that forests have nothing whatever to do with the control of water. This is as absurd as would be a statement that forests absolutely prevent large floods. My time does not suffice to enter on this subject in detail, but I wish to say this in regard to the influence of forests on run-off of water: There are many factors controlling run-off, of which the vegetative cover is one. Forests do exercise a powerful influence on the distribution of water after it falls, and do tend to regulate the flow of rivers. This is, however, only one factor and may be and often is entirely overbalanced by other factors like long continued rainfall or sudden thawing of snow in the mountains. The Geological Survey is developing some very important and interesting facts regarding the influence of forests on erosion in the South, which I hope may be brought out in this meeting.

"We have, then, in the South vast forest resources; they are being exploited rapidly and their products are contributing enormously to the production of wealth in many parts of the nation. Our problem touches the method of handling these great resources. Are the forests being developed in a way to benefit the South permanently?

"The bulk of what is put on the market is from timber 150 years old and upwards. That is, we are still drawing mainly on the original supply and only locally from second growth timber. In the main no effort is being made to replace the old stock as it is cut. The cutting takes place without reference to a new crop of trees and we still have that greatest enemy of the forest, fire, which not only damages standing timber to a greater extent than is commonly believed, but also kills the young timber and prevents the establishment of new growth. At present the supply of timber in the South is rapidly being diminished without replacement. Moreover, the forest fires are primarily responsible for the damage resulting from erosion and disturbance of stream-flow in the mountains. This then is the situation: That the forests will not continue to serve the South as they are now serving it and could under better conditions be made to serve it perpetually. Unless there is a correction of these conditions the supply of products will not be maintained, local industries will decline, or vanish, land values will be permanently reduced, and the benefits arising from the mere existence of well managed forests will be lost, with unfortunate results.

LARGE WHITE OAK IN A HOLLOW BELOW A CLIFFWIND COVE, JACKSON COUNTY, KY.

FOREST PROBLEM EASY

"On the other hand, there is an enormous area of land suited only for

"DEADENING" IN APPALACHIAN REGION, LAND CULTIVATED WITHOUT FURTHER CLEARING. A CRUDE SYSTEM OF AGRICULTURE, EAST TENNESSEE

GATHERING CRUDE RESIN FROM WHICH TURPENTINE IS DISTILLED. CUP AND GUTTER SYSTEM, LONG LEAF PINE FOREST, FLORIDA

forest growth. The South is endowed with species which grow with great rapidity. Conditions of climate are such that natural reproduction occurs with tremendous vigor if only given a chance. There is no region except the far Northwest where forestry is so simple and the results so sure. Actual estimates show that it is entirely practical to secure from the area which should be permanently in forest fully 24 billion feet in the long run, by growth, if the forest is properly handled. Much of this area is in the mountains and the very management for timber production will secure the indirect benefits of the forest. We must definitely answer the question whether the South will continue for all time to furnish the nation with 20 to 30 billion feet of timber, with all that is meant by such a continuous production of wealth, or will give up this opportunity. I am stating no new or unfamiliar facts. Year after year we gather in different conventions and restate this problem and dwell on its importance. Year after year the problem becomes a more critical one to the country.

"To-day we come together again to discuss it in the hope that we may arrive at some definite program which will lead to positive results.

"No one appreciates better than I the practical difficulties in the way of bringing about the desired end. No one appreciates better than I that it can not be accomplished at once. I do maintain that it can be accomplished to the full extent of the results I have suggested, and even more. My great object is to see a beginning made which will actually lead to the final goal.

"The main difficulty has been that efforts have been scattered and individual. We should appreciate that our efforts must be organized and all agencies which can contribute to the work must be brought into effective coöperation.

"The greatest obstacle in the way of forestry is forest fires. This enemy can never be mastered except by organized effort. With the fires mastered the rest is comparatively easy. We must therefore, with all our forces, national, State, and private, endeavor to overcome the fire menace. How this is to be accomplished will be brought out at this convention. The public must aid in the matter of a uniform, consistent, and sane system of taxation which will enable the owners to foresee the changes against their enterprise in the future. Private owners must accept their responsibilities as trustees of a great natural resource and handle their property in a way which will build up and not injure the interests of the State. Just what should be done and what can be done in practice? Where shall we begin and what is the first step? This is now before this conference to discuss, and it is my confident hope that some definite, clear-cut conclusions can be reached. * * * *

In a short time W. N. Millar, superintendent of the Kaniksu National Forest of the first district, will resign to become forest inspector of the Dominion Government forestry branch

Representative Warburton, of Washington, has introduced a bill for the sale of timber on the Quinaelit Indian Reservation, in Washington, the proceeds to go toward the construction of a road into and through a part of the reservation.

The Senate has passed the bill already passed by the House, and fathered by Representative Pary, of Montana, authorizing the sale of burnt timber on public lands, under regulations of the Interior Department.

RAISING DEER ON FOREST PRESERVES

By Percival S. Ridsdale

FOREST land in Maryland, which is now of not much practical use, may soon be made to return an indirect revenue as a feeding ground for domestic American elk, white tailed deer, red deer, fallow deer, roebuck or any other members of the deer family. This condition is contingent upon the passage of a bill by the Maryland State legislature authorizing the raising and selling of these deer in enclosed preserves by the owners of tracts of forest land.

The idea is to raise deer for the market, and as there is fine feeding and plenty of it on the cut over forest lands of the State, much of which may readily be enclosed with wire fences, and as the flesh is good eating and good prices may be commanded for it, there is every indication that, if the bill passes the legislature, the project will prove successful.

The plan originated with Mr. William M. Ellicott of Baltimore who has hunted big game in the United States, Mexico and Canada and who has been interested in learning of conditions in Europe where the markets are well supplied with venison and other game from private preserves and breeding establishments. He is enthusiastically in favor of the plan and is doing what he can to secure the passage of the bill.

Mr. Ellicott in talking of the proposed law said: "At first sight this seems to be a matter of only ordinary interest, but when it is realized that the deer as a wild animal has become practically extinct in Maryland and that only occasionally is venison seen in our markets, and this at almost prohibitive prices, it will be clear that a great benefit may be conferred upon the community and that an industry of commercial importance, heretofore unknown in the State, may be established if it becomes a law.

"The deprivation of the public in the matter of venison as a part of the regular dietary is altogether unnecessary and unreasonable. While wild game should be amply protected and means provided for its propagation, it has been amply proved that a large population cannot be kept supplied from that source, and it is reasonable and proper that States where it exists should prohibit its export and sale, as is the case now in all the Eastern States.

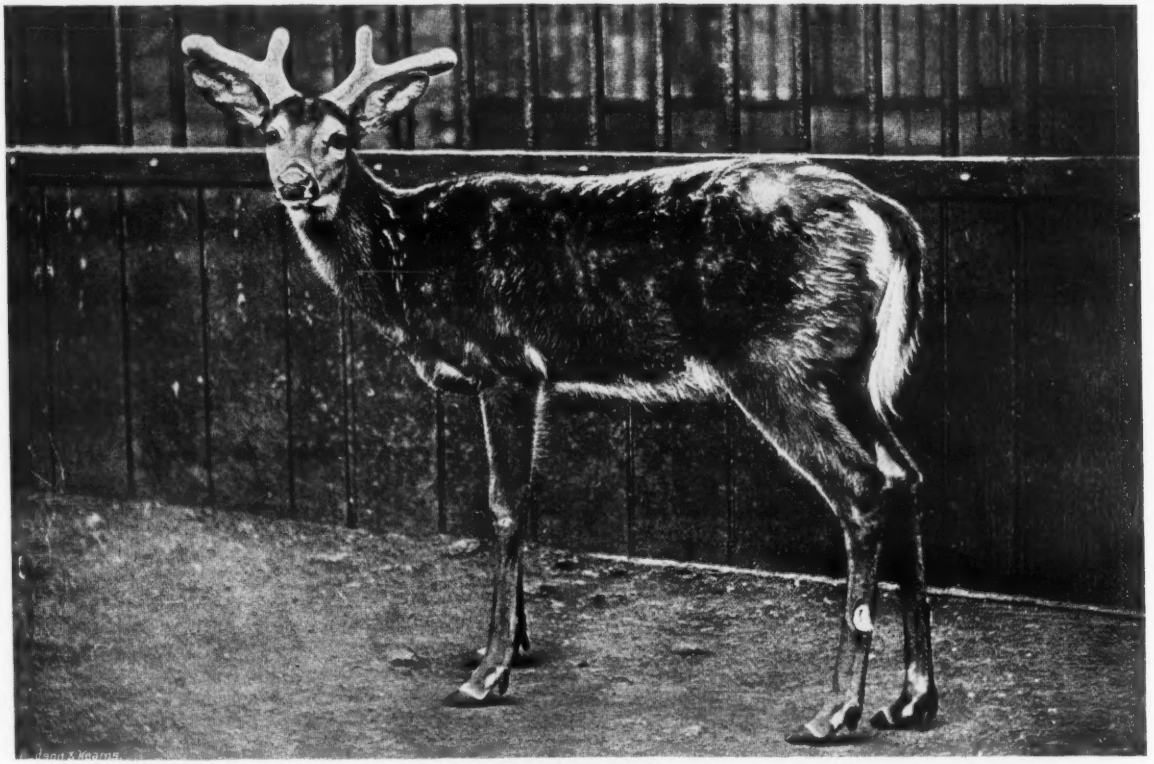
THE BUSINESS WOULD BE PROFITABLE

"The sale of game bred and maintained in inclosures from stock which has been legitimately acquired is a totally different matter and should be encouraged to the fullest extent.

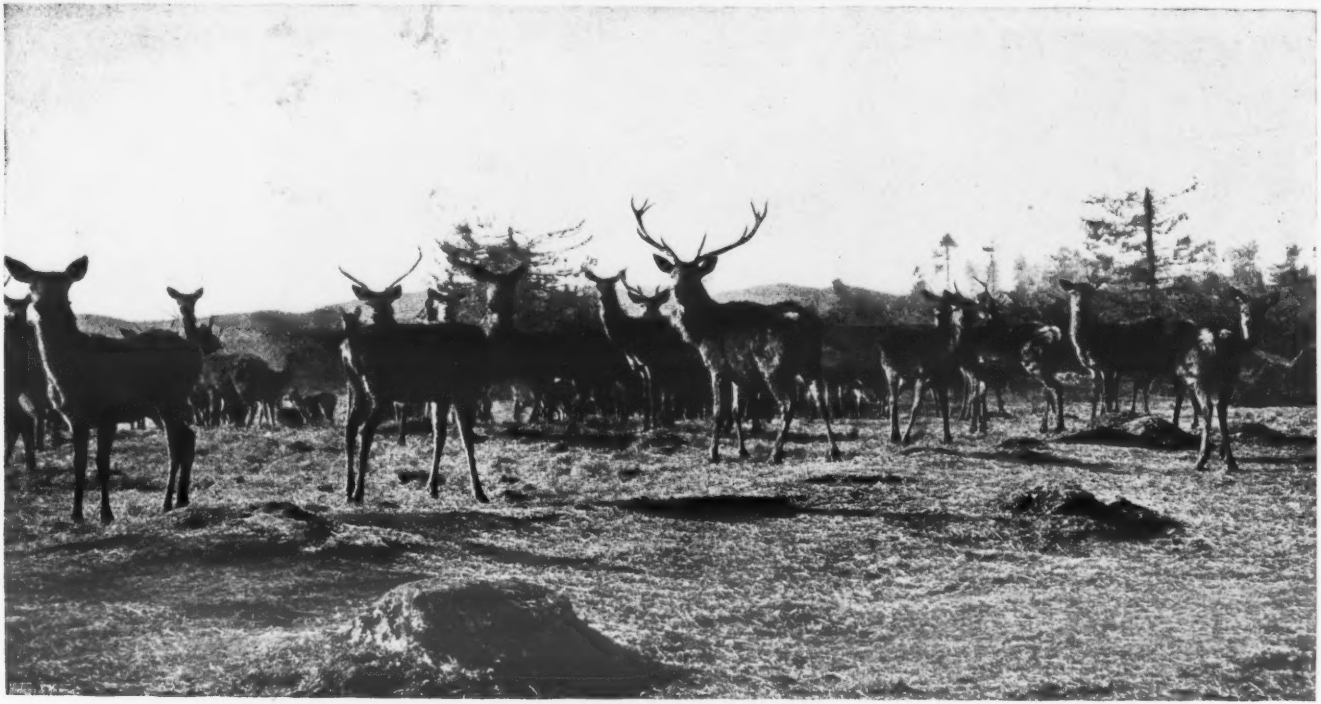
"Both official and unofficial reports go to show that several varieties of deer can be profitably raised; that they require less care and subsist upon rougher food than any of the domestic animals except the goat, and that their value for food purposes ranks with the best beef and mutton.

"Breeding stock can be had at present at very low prices—$15 to $25 for deer and $20 to $75 for elk (Wapiti) as opportunity affords. According to Farmers' Bulletin No. 330, of the United States Department of Agriculture, the most available source of supply is the surplus from private herds, zoological gardens and parks.

"The roughest waste lands with a plentiful growth of underbrush, weeds, etc., and running water are best suited to the enterprise. Deer prefer to brouse on scrub growth and to eat the coarsest weeds rather than the best of hay. When pasture is limited they do well on corn, oats, wild hay and alfalfa.



A VIRGINIA DEER



A HERD OF RED DEER

CAPTAIN AND KING

"So rapidly do white-tailed deer, the common variety, increase that preserves soon become overstocked unless their numbers are diminished from time to time. A herd of 19 head which increases to 400 in 10 years is one not uncommon instance. The does usually produce twins annually after the second year, when they have their first fauns.

THE RATE OF INCREASE

"On our preserve in Pennsylvania, where 90 deer were liberated 10 years ago, there are said to be nearly 4,000 head. In many cases the fences have had to be taken down to let them escape owing to shortage of food.

"It is probable that the Wapiti, or Rocky Mountain, elk is best suited to breeding for market. This animal, second only to the moose in size, formerly ranged over the greater portion of the United States. It was plentiful in Maryland when the first settlers came, and we have reminiscences of its presence in such names as Elkton, Elkridge, etc.

"A mature elk will weigh from 600 to 1,000 pounds, and the proportion of meat to correspond is greater than is the case with beef or mutton. Heads, horns and hides are also valuable, and the net return from one animal would be $150 or more.

"Deer and elk become very tame when kindly treated and given a little salt or corn from the hand.

"An important fact is that the business can be engaged in by the smallest land owner with very little equipment, while it is also capable of extension if capital is available. One hundred and sixty acres can be fenced for $200 for elk and slightly more for deer. Even in a paddock, with shelter and food, the business can be successfully prosecuted.

"In and around the Yellowstone Park there are some 30,000 elk. Their summer range is in the mountains, but at the beginning of winter they seek the plains where they formerly found ample food to carry them through the winter. In recent years most of this land has been taken up by farmers and the elk find it fenced and haystacks guarded and there is nothing to save them from starvation. Immense numbers have miserably died in this way.

DANGER IN THE WIND

Photo by C. Reid.

A MAGNIFICENT SET OF ANTLERS

"Meagre appropriations have recently been made by the State of Wyoming to feed them, but this has not proved altogether successful and there is still untold suffering and waste. It has been suggested that some of these elk should be transported to other ranges or put on private estates where they will be cared for. Divided up among the States they would soon become a source of profit. While in this present condition they only excite pity and are practically useless.

MONTANA HERD SOLD IN ITALY

"A large private herd in Montana has recently been sold in Italy, where they will be set at liberty on preserves in the mountains of the north.

"Many American elk have been sent to England and the continent of Europe, where they have been crossed with the European breeds, which has very much improved them."

The bill provides that anyone desiring to engage in the raising or selling of domesticated American elk, white tail, red, fallow deer, roebuck or any species of deer in an inclosed preserve may do so upon receiving a license from the State Game Warden. The license fee is fixed at $5 to be retained by the Game Warden, who upon being satisfied with the good faith of the applicant shall issue a breeders' license.

The license, it is provided, shall give the breeder the right to raise and sell for breeding purposes all species of deer or to kill the animals at any time and to sell the carcasses for food. When the preserve is located in Washington, Allegany or Garrett counties, the bill provides that white tail deer killed upon

THE MONARCH OF ALL HE SURVEYS

the preserve shall bear a distinctive mark to show that the animal was domesticated. A fine of $50 and forfeiture of the license is imposed for failing to place a distinctive mark.

It is also provided that the preserve shall be fenced in a manner approved by the Game Warden.

FORESTRY IN SOUTH AFRICA

CONSUL EDWIN N. GUNSAULUS of Johannesburg, South Africa reports that "Outside of the operations of the Forest Department there are practically no forestry operations in South Africa. The Government holds nearly all the lands of forest value, and the Forest Department purchases seeds from abroad and both sells seeds and raises large quantities of trees for transplanting which it sells at low rates to the public. The officer in charge of the Forest Department of the Union of South Africa is Mr. J. Storr Lister, Chief Conservator of Forests, Pretoria, Transvaal.

"Elementary forestry, enabling students to enter the subordinate grade of the Government forest department, is taught at the Government forest school at Tokai, near Cape Town, Cape Colony, and a course in forestry suitable for farmers is given at the Government agricultural school of Cedara, in Natal Province. Vacancies in the higher grades of the forest service are filled from the South African Rhodes scholars who successfully pass through the Oxford School of Forestry, with its attendant courses on the Continent of Europe."

PAPER COMPANY'S FORESTRY PRACTICE

By B. A. CHANDLER

Assistant State Forester of Vermont

THE Champlain Realty Company which is a land holding company of the International Paper Company is taking a very progressive stand in forestry in Vermont. It is carrying on three main lines of work; fire protection, nursery and planting work, and marking their timber for cutting.

The fire protection work consists of coöperation with the State in every possible way and in independent patrol work.

Their planting policy is very progressive. For the last eight or ten years the Company has been buying abandoned farms which were coming up to spruce and hardwoods. It is estimated that it has at present about 10,000 acres of open land to be planted connected with these farms. Besides there will probably be about 100 acres each year cut over where it will be impossible to get natural reproduction.

For the past three years including this coming spring, it has purchased and planted about 100,000 Norway spruce in Vermont. It maintains a nursery at Randolph, Vermont, from which it intends to produce 1,500,000 trees yearly. The present stock in this nursery is estimated as follows: 75,000 Norway spruce, 1 year transplants; 400,000 Norway spruce, 2 year seedlings; 1,100,000 Norway spruce, 1 year seedlings. The Company expects therefore from this nursery in the spring of 1913, 450,000 transplants. It will probably be five years before this nursery will reach the full capacity of 1,500,000 plants yearly.

1,500,000 plants will plant 1,240 acres. Substracting from this the 100 acres added each year by clear cutting, leaves 1,140 acres of land to be planted yearly. Thus it will take about nine years to plant up the present open land and what will probably be cut clear in this time.

MARKING WORK

The policy as mapped out by the Company is to have all the timber cut in Vermont marked, using a 12″ diameter limit as a guide in the marking, with the idea of cutting over this same land again in fifty years. This marking is being done under the general direction of the State forester's office.

There are two very general types of tree-growth in this region: mixed hardwoods with scattered spruce, and pure spruce. The pure spruce may be further divided into ridgetops and spruce slopes. A few sections were so heavily culled in former years that nothing can be done now but to cut clean and plant. In the more inaccessible valleys which have never been cut over, it is possible to do more. Even here, however, the lower slopes are usually covered with mixed hardwoods and scathed spruce type, where it will be impossible to get spruce reproduction until market conditions permit the cutting of the hardwoods at a profit. It has been the aim in this type to move all the trees that will make growth enough between now and the next cut to earn a good rate of interest on the money invested in them at present stumpage values. In doing this the diameter limit has been only a very rough guide. All trees below the limit which showed signs of disease, injury by porcupines, or had such poor crowns that they would never recover and make good growth, were cut. All rapid growing trees above the limit were saved. In this hardwood type the wind is not a very important factor for it occupies the lower slopes and the hardwoods protect the spruce. Although no especial attempt was made

MANY OF THE SPRUCE TREES HAVE BEEN SERIOUSLY INJURED BY THIS FUNGUS AND ARE IN NEED OF CUTTING.

to get spruce reproduction under the hardwoods, especially where it looks as if market conditions would not warrant their being cut within the next fifty years, the above system has resulted in enough spruce being left to seed up the woods, and to seed up the whole area if the hardwoods should ever be cut.

DIFFICULTIES OF THE WORK

In the pure spruce slope type, which is usually situated at higher elevation than the mixed hardwoods with scathing spruce, the wind must be taken into consideration as well as the red rot and the porcupine.

The aim in this type is not only to leave the trees that will earn a good rate of interest in growth for the next fifty years but to get spruce reproduction. It is impossible to leave individual trees standing alone for the wind will blow them over. The system finally worked out consisted of leaving groups of seed trees distributed where possible, so that no part of the clear cut area between the groups is over three or four tree heights from a group. As far as possible these groups were composed of the type of trees that were left in the mixed hardwoods and scattered spruce type.

The principal difficulty in getting this kind of work done is not with the leading men of the Company, but with the contractors, camp bosses and choppers. The bosses even tried to fool the markers on several different occasions and several of the groups of seed trees were spoiled by roads being swamped through them when the markers were not there. It was almost impossible to get the choppers to drop diseased trees which were not worth removing from the woods. In the Company's camps more effective work was done than in the contractors' camps and some of the

THE SPRUCE IN THIS GROUP ARE MARKED TO BE CUT CLEAN BECAUSE OF THE SPLENDID SPRUCE REPRODUCTION ALREADY STARTED

A TYPICAL LUMBER CAMP OF THE INTERNATIONAL PAPER CO. IN THE GREEN MOUNTAINS

Company's bosses coöperated with the markets in every way.

These difficulties show that besides marking the timber for cutting we must reorganize our logging operations if we expect to accomplish the best results. Under the present system all the harvesting is done by poorly paid men. Perhaps the lumber companies of the past have been right in this policy, for stumpage was not valuable enough and labor was cheap enough so that a little waste did not count.

THE NEW STYLE OF CAMP BOSS

As stumpage increases in value the camp boss will be a very different class.

First. He will be a man with the forestry point of view, having as much interest in the future crop of timber as in the present cut and will know what should be left for the next crop.

Second. He will locate his roads on definte grades with definite knowledge of what grade gets logs onto the yards cheapest with the least wear and tear on the teams. These roads will be located as much in reference to the timber that is being left as to that which is being taken.

Third. This new type of boss will be an expert in every part of the operation, not only knowing all the old efficient methods but continually thinking out and learning from other people new and better ways of doing things. He will not be tied down by tradition or precedent.

Fourth. This man will improve the character of his help by paying for efficiency.

Fifth. The lumber operation of the future must be run on a financial basis and the boss must know how much a certain type of road ought to cost and if the cost for a given week runs too high, he is going to know the reason.

Of course a detail cost keeping system will be necessary.

Those of us who look forward to some such system as outlined above must realize that it cannot be put into operation at once nor will it be perfected in ten or twenty years.

The man we want must get the forestry point of view and the fundamental principles of his work in some undergraduate school or some ranger school where the course is shaped for him, and his woods training under the best woods bosses we now have. Some of the brightest young fellows in our camps today will probably make the best men, if they will get the necessary education.

IDEAL SPRUCE LEFT FOR SEED PRODUCTION AND GROWTH. NOTE SYMMETRICAL, THRIFTY TOP, ALSO THE OTHER SPRUCE LEFT AFTER LUMBERING BY THE INTERNATIONAL PAPER CO.

HICKORY BARK BORER

By E. P. Felt
State Entomologist of New York

THE pernicious hickory bark borer has already destroyed thousands of magnificent trees in Central and Eastern New York. The inner bark of many of the affected trees contains stout, white grubs, about one-quarter of an inch long, which will develop into beetles from the last of June to the last of July. These insects, in the natural order of events, will continue their nefarious work, and numerous other trees will succumb.

It is extremely important that all infested hickories, especially those showing only particles of brown or white sawdust in the crevices of the bark and the characteristic working of the insects within, should be located and the infested bark destroyed before the end of May. Such trees are more dangerous to the welfare of adjacent living hickories than others, which may be fairly peppered with the numerous exit holes, appearing as though they had been made with No. 8 buckshot. The borings of this pest in the inner bark are very characteristic, there being longitudinal galleries 1 to 1½ inches long, about one-eighth of an inch in diameter, and with numerous fine, transverse galleries arising therefrom and gradually spreading out somewhat fan-shaped.

There is only one thing to do in the case of a serious infection, such as that indicated by dying trees or branches. All badly infested trees or portions of trees should be cut and the bark at least burned before the following June, in order to prevent the grubs from maturing and changing to beetles, which may continue the work in previously uninfested trees. It is especially desirable to locate the hickories which have died wholly or in part the last summer, because they contain living grubs. General coöperation over an extended area in the cutting out of infested trees and burning of the bark, as indicated, will do much to check this nefarious pest. It is essential to destroy the grubs in the bark by fire or by submersion in water before the date given. This does not make it impossible to utilize the timber and most of the firewood, at least.

NURSERY AND PLANTING TOOLS

By Wm. H. Mast
Gunnison National Forest

THE stupendous problem of reforesting the immense areas of barren potential forest land within and outside our State and National Forests is causing many a student of forestry to knit his brow in deep study with the hope of discovering some successful method of rapidly clothing these vast unproductive areas with green thrifty trees.

We have two courses of action outlined for us. One is reforestation by direct seeding and the other by planting. Experiments so far indicate that success by the former will be restricted to the most favorable sites and be secured on these only when seasonal conditions are favorable. There are, however, many large areas where planting will be the only manner by which a forest cover can be secured. But planting by the best methods we now know is costly and rather slow, therefore any device tending to cheapen production of nursery stock, facilitate transportation, and make possible extensive and successful planting work will be regarded with favor. The following description of some devices which have been used advantageously may assist those who are trying for more efficient methods along these lines.

DRILL BOARD

By broadcast sowing the distribution of seed is such that the best utilization of plant food and soil moisture is secured for the seedlings, but drill sowing is especially advantageous because of the lessened injury to the root systems of the seedlings in digging, and because of the time-saving effected in taking up the seedlings. Machine seed drills are not generally satisfactory for use in coniferous nurseries.

For hand work a heavy board with cleats 1-2 to 3-4 inches wide and properly spaced is used. One for making 12 drills 3 inches apart is the best I have seen.

SEED TROUGH

For distributing seed in drills the writer has, since 1904, used a small trough. It is made of 2 six-inch boards beveled on one edge and hinged together as shown. Made in this way it balances when set in the drill. The sower can cast the seeds against one of the broad sides and as they roll to the bottom of the trough they distribute themselves very evenly. If narrow boards are used it is necessary to carry the hand directly over the trough as the seeds are dropped. This makes slower work and it is much more difficult to get an even distribution. When seedbeds are 4 feet wide or wider two men usually work on opposite sides of the bed, each scattering seed from his end to the middle of the trough.

For securing an equal amount of seed in each drill it is best to use a small measure. A paper shotgun shell which may be cut down until it holds just the desired number of seeds, is very convenient. Seed sown in drills in this manner is best covered by sifting soil over it, using an ordinary sand sieve of ¼ inch mesh.

For maintaining even moisture and heat conditions during germination leaf mold or straw is commonly used. Where these are not obtainable burlap may be spread on the beds and sprinkled frequently.

SHADING

Both high and low shade frames are in use, some nurserymen preferring the low while others prefer the high frame. A simple low shade frame devised by the writer for use at the Halsey Nur-

WOVEN SLATTING CRATES USED FOR A SHIPMENT OF FIVE THOUSAND TRANSPLANTS TO A RANGER

sery, Nebraska National Forest, is very satisfactory where protection from rodents is unnecessary. It consists of slatting in 50-foot rolls stretched over a track of 1x2's. A row of 2x2 stakes on each side of the bed supports the track 12 to 14 inches above the surface of the bed. If the bed is curbed the stakes are placed just inside the curbing and the 1x2's nailed to the inner sides of the stakes. When weeding the slatting is loosened at one end and rolled back, the track serving to steady the laborer and making it unnecessary for him to put one hand down in the bed when leaning over at work.

STORAGE

When coniferous seedlings are dug for transplanting or when transplants are taken up for field planting it sometimes becomes necessary to hold large numbers in storage for a greater or less length of time while the planting is in progress. To do this without injury to the stock it is important that provision be made to prevent rapid transpiration lest the equilibrium in the moisture content of the plant be disturbed and its vitality seriously reduced.

Heeling-in is a common practice, but if there is not space for this in the storage house and it must be done outside the plants should be covered with a thick blanket of straw or other mulch supported on slatting a few inches above the tops of the trees. This method of covering permits a free circulation of air for the tops, but keeps them from warming up enough in the middle of the day to cause "forcing."

In 1908, when handling a very large number of coniferous seedlings at the Halsey Nursery, I found that good results could be obtained from stacking

INTERIOR OF SEEDLINGS STORAGE HOUSE, HALSEY PLANTING STATION, THOMAS COUNTY, NEBRASKA

trees in cylindrical piles, roots to the center, as shown in the accompanying illustration. In this method of piling a liberal supply of moist sphagnum between layers of roots prevents them from drying out, and the tops to the outside, occupying a circle of larger circumference than that occupied by the roots, have adequate air space and are not likely to mold or mildew. It is desirable, of course, to place these stacks in a storage shed where a moist atmosphere can be maintained and the temperature held down.

Where tall stacks are to be built shelves should be fastened to the center post about every 2 feet to prevent the pressure from becoming too great on the lower layers.

NURSERY BOXES

Where nurseries are so situated that trees can be taken up and hauled direct to the plantation the same day they are planted and where seedlings are being dug and moved immediately to transplanting areas tight boxes 3 feet long and 2 feet wide are convenient for the temporary packing necessary. These boxes should be padded inside with burlap or with burlap over sphagnum. They should also contain several pads fastened at one end to the bottom of the box. The pads separate successive layers of trees. These boxes should be provided with handles as shown in the illustration.

SHIPPING CRATES

For railroad shipment an extremely strong, yet light shipping crate can be made by forming four boards 1x4x14 inches into a square for the ends and nailing woven slatting onto them for the sides. The center of the crate may be lined with burlap to assist the sphagnum in excluding air from the roots, while the open ends of the box allow

BROADCASTING AND MONUMENT NURSERY

free air for the tops. I first made this crate in the spring of 1908 and have found it much stronger and more satisfactory than any other crate of equal weight. This crate is quickly constructed, and when used once is usually destroyed.

As National Forest and commercial nursery shipments increase economy demands a light durable crate which, when emptied, may be collapsed and returned to the nursery for further use. In meeting this demand the principle of cylindrical stacking as described under "storage" may best be used as no other system presents the same opportunity of exposing the tops for the necessary amount of air and at the same time keeping the roots moist with so little sphagnum. The cost of shipping will be correspondingly decreased as the weight of the container and necessary packing is decreased.

PLANTING BASKET

During the first few years of work at the Halsey Nursery it was customary to place the trees in buckets of water as soon as they were dug in the nursery. The trees were also carried in buckets containing water when planting was being done in the field. Owing to the sandy nature of the nursery soil very little of it clung to the roots when the trees were taken up, and *that* was removed by the water. The belief came that an effort should be made to hold as much of the soil on the roots as possible, so the practice of placing them in water was discontinued. Therefore, in 1909, before taking up the trees the beds were soaked, and after digging great care was taken to keep the roots moist with wet sphagnum and burlap.

The effort to keep the roots moist without putting them into water led to Planting Assistant LaMoree Besley's devices, the padded nursery box described above and the planter's basket, since used with great success.

The Besley Planting Basket is 12 inches wide, 20 inches long, and 8 inches deep and made of light galvanized iron, having two handles as a market basket, and 4 short legs consisting of stove bolts 1 inch long

DRILL BOARD DEVISED AND USED IN THE MONUMENT NURSERY BY W. H. SCHRADER. THE BOARD IS SETTLED IN THE SOIL FOUR TIMES FOR EACH BED COVERED BY A TWELVE-FOOT SHADE FRAME

soldered in the corners. The top is rolled over a number 12 wire to give strength. For the inside of the basket several thin quilted pads are furnished. These are fastened on vertical wires at one end and the trees are placed in layers between the moistened pads. This provides perfect protection for the lower layers while the upper layer is being used.

By continued fertilizing the physical properties of the nursery soil have been so changed that now plants may be taken up with more soil clinging to their roots than formerly and by the use of the above described box and basket are kept in excellent condition until planted.

TRENCHER

Commercial nurserymen make use of two heavy, wheeled implements known as "trencher" and "firmer" for putting in broadleaf tree cuttings. These, of course, are used in broad level fields which are in a perfect state of tilth. They simply apply the principles of slit planting by the use of horse power. The first implement opens a continuous slit or trench into which the cuttings are placed and the second follows and packs the soil firmly against them by means of two very heavy cast iron wheels rolling on either side of the row at a slight angle to the vertical. The writer, in an attempt to make use of the principle of the trencher for planting coniferous trees on the Nebraska Forest where the steep hillsides make the use of wheeled machinery practically impossible, devised the implement known as the Mast Forest Trencher. It consists of a heavy V-shaped shoe fastened on an ordinary steel plow beam and supplied with handles similar to plow handles. The shoe is 24 inches long, 12 inches deep, and is made V-shaped by riveting plates of steel together at the bottom and separating them 3 inches at the top. These plates are welded and drawn out into a thin sloping edge in front, the lower part of which is widened into a broad nose. The nose draws the shoe into the soil and a small horizontal plate attached

THE PLOW WITH TRENCHER FOLLOWING

to the bottom of the shoe serves to hold it to an even depth.

With a strong slope from the nose to the top of the shoe in front, roots and trash in the soil that are not severed when the shoe strikes them are inclined to be raised above it and then slide off at one side of the beam without injuring the trench. The length of the shoe is such as to cause the sides of the trench to be sufficiently troweled to make them stand up until the planter comes along to put in the trees. The use of a short shoe results in the trench caving down and half filling in many places almost immediately after the trencher has passed.

The trencher is drawn by 3 horses and in its use in the Nebraska and Kansas Forests the trench is usually made in a furrow turned with a side-hill or ordinary plow. A man with planting basket follows the trencher and puts trees into the trench being careful to have the roots well extended toward the bottom. As the crowns of the trees are brought to the proper height the planter sets his foot at a slight angle to the trench caving the side in against the roots. Men with long handled tampers follow setting the soil firmly against the trees and closing the trench between the trees to reduce the chance of evaporation. A gang of 10 to 15 men is required to keep up with the trencher and can plant from 12 to 20 thousand trees per day. The trencher was first used on the Nebraska Forest in 1909, and more extensively in 1910 and 1911.

R. E. Benedict, Forest Service Inspector, has resigned and will take a position in the branch of forestry of the Province of British Columbia. The first work that he will undertake will be that of organizing the forest fire patrol, after which he will help to organize other branches of the forestry department of that province.

CHARACTER OF THE FOREST ABOUT SEATTLE, NEAR THE UNIVERSITY OF WASHINGTON

FORESTRY AT THE UNIVERSITY OF WASHINGTON

IN accordance with the diversified needs of the State the University of Washington has the Colleges of Liberal Arts, Engineering, Forestry, Pharmacy, and Mines and the School of Law. The College of Agriculture is distinct from the University and has its own governing board. The forests of Washington and the Pacific Coast generally are the most magnificent in the world. Nowhere else is the yield per acre so large nor the rate of growth in the forest as a whole so rapid. The past rapid development of the Northwest Coast region is directly attributable to its immense forest wealth.

Forestry in Washington is in many respects as important as agriculture. Up to the present the products of the forests have been more important than the products of fields, farms, and mines combined. The State of Washington ranks first of all the United States in the production of lumber. Oregon ranks ninth. Together the two states produce about 12 per cent of all the lumber manufactured in the country. In addition Washington produces more than 65 per cent of all the shingles manufactured in the country.

Because much of the land of these States is unsuited to the production either of agricultural crops or of stock, forest products will always be the basis for some of the most important industries. It has been estimated by Forest Service officials that ultimately 50 per cent of all the lumber manufactured in the country will originate in a few of the Western States. Washington has now more than 12 million acres in permanent National Forests, the State itself has several hundred thousand acres of land, much of it heavily timbered and over six million acres of forested lands are owned or controlled by lumber companies. In addition to the lands in public forests, much of the land privately owned will always be more important in the production of timber than of any other crop. It is a matter of note that Washington and Oregon alone contain about one-third of the standing timber in the United States today.

In providing instruction in forestry the State of Washington has thus opened the way for training some of its young men to work in one of its most important fields of industry, to help solve some of the many problems the community will be called upon to solve in the future. With a distinct feeling of the need of instruction in forestry in the Northwest and particularly in Washington the College of Forestry was established in 1907.

ORGANIZATION AND CURRICULUM

The original purpose of the department was to prepare men to meet the various local needs in forestry, and to promote the interests of forestry in the State by encouraging the right use of forest resources. With the demand for men on the National Forests the energies of the School were at first directed entirely toward training men for the position of technical assistant. It was deemed possible to train men for this position in a four year undergraduate course, and this has been an entire success. However, as the technical work of this course did not differ materially from that offered in graduate schools of forestry it was considered only just to offer a master's degree to students who had already obtained a collegiate degree and wished to complete the required work in technical forestry. In that case a master's thesis is required. The work is completed in two years. At present arrangements are being made for more advanced work for this class of students. Two such courses are being offered this year.

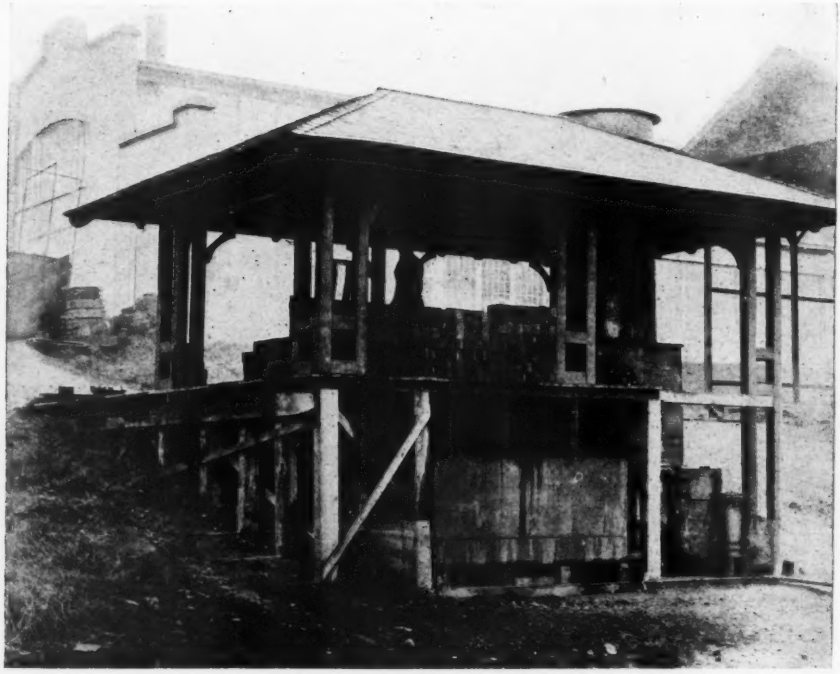
In 1909 a special short course of twelve weeks was established for Forest Rangers and Guards desiring to increase their efficiency, or for others who wish to fit themselves for these positions. In connection with this

TIMBER PHYSICS LABORATORY, UNIVERSITY OF WASHINGTON

course it was found that there was an almost immediate demand by young lumbermen and by woodland owners for a similar class of instruction, and a modified short course to meet this demand was given for the first time in 1910. Both of these courses are working out most admirably, so much so, that it was found necessary to extend the Ranger Course over two years of twelve weeks each.

Another field which the Washington College of Forestry had in mind from the first,—that of logging engineering —is now opening up. While comparatively few lumbermen are ready to take on men strictly as foresters, they are ready to employ men who combine with their forestry training a sufficient knowledge of civil and mechanical engineering to enable them to lay out logging roads and after a term of apprenticeship to take charge of logging operations. The school is now prepared to offer a lumberman's group designed especially to meet the needs of young men preparing to take charge of logging and milling operations, or wishing to enter upon a business career in some phase of the lumber industry.

Still another field for which the school will need to provide in order to meet the local demands, that of engineer in forest products, is just beginning to assert itself. Wood preservation and the manufacture of by-products are rapidly becoming necessary adjuncts to the saw mill. Much of the present enormous waste will lend itself to remanufacture or to the manufacture of by-products. The increasing cost of raw material is making this necessary. It is now possible to utilize at a substantial profit much of the waste which it was formerly necessary to get rid of at considerable expense.



OPEN TANK PRESERVATION PLANT

MEMBERS OF THE FACULTY

The courses in the auxiliary sciences and other subjects are presented by the faculties of the departments of the University under which the respective subjects naturally fall. In most cases it is now possible to present these subjects in courses especially arranged for forestry students. The faculty of forestry consists of Frank G. Miller, M. F. Yale, Dean; Hugo Winkenwerder, M. F. Yale, Associate Professor; E. T. Clark, M. F. Yale, Assistant Professor; Bror L. Grondal, A.B. Bethany, Graduate Assistant; Bert P. Kirkland, Yale, Supervisor Snoqualmie National Forest, Lecturer on Forest Management; O. P. M. Goss, C. E. Purdue, in charge Timber Physics; William T. Andrews, Instructor in Mensuration and Lumbering. The work given by Messrs. Kirkland, Goss and Andrews is equivalent to that ordinarily given by one instructor on full time. In addition 10 officials of District 6 of the Forest Service annually give a total of 80 lectures in their respective lines. These lectures and a course in Veterinary Science by D. W. Harrington, D.V.M., are arranged more especially to meet the needs of the Short Course Students.

The forests about Seattle give the students every opportunity for study and practice. There are magnificent forests of virgin timber and smaller areas of second growth forests, both of which are invaluable for demonstrations in silviculture and practice in cruising. Much of the timber is now being logged. This gives the student not only a chance to study the old as well as the most improved methods of logging, but also the location and construction of camps and roads; it furthermore gives him logs to scale, it gives him felled trees to make volume and growth studies; and it allows him

FORESTRY MUSEUM, UNIVERSITY OF WASHINGTON

opportunities for research work. And one of the special advantages is that the instructor can take his class from the school building into the very heart of these forests in less than an hour by foot or by trolley.

THE EXTENSIVE GERMAN FORESTS

CONSUL GENERAL A. M. THACKARA, of Berlin, states that Germany's area of forest lands is about 34,500,000 acres, or about 27 per cent of the whole area of the country. About 11,000,000 acres of forest lands belong to the various State governments of Germany, 5,500,000 acres are public forests; over 600,000 acres belong to Kings and Princes of various States, while 16,000,000 acres are privately owned.

J. R. McCarthy, field agent for the Chestnut Tree Blight Commission, with headquarters in Philadelphia, is now at Ridgway, Elk County, Pennsylvania, and will make his headquarters there for several months, during which he will examine the trees of the county for the fungus disease.

The American Forestry Co., of South Framingham, Mass., has just received an order for 20,000 little white pine trees, about eight inches long, from the Marlboro Water Dept. These will be set out around Lake Williams, which supplies the city with water.

FORESTS AS AN INVESTMENT

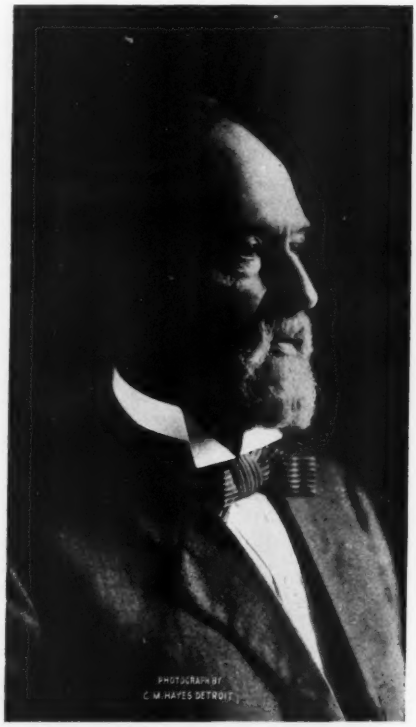
By Hon. Simeon E. Baldwin
Governor of Connecticut

I WISH Arbor Day could be the occasion of considering anew the importance of forestry to the business interests of Connecticut, and what can be done towards multiplying our woodlots in the smaller towns. We need more forestation for two objects —to study and preserve the natural flow of our streams and rivers and to raise wood to sell. There are, our State Forester tells us, 1,000,000 acres of land in this State fit for nothing but forestation. You can use them for pasturage, but they do not produce enough in that way to make grazing pay. But if judiciously planted, they can grow profitable crops of timber and wood pulp for paper making.

Crops that are fit to market only after a growth of 25 or 50 years are not so attractive at first sight as crops that are gathered every year. Forestation can be so conducted as to yield annual crops, but it is not so conducted in Connecticut now. We have a Forest School at Yale, where they teach the business to others. We have some State woodlots, State owned, which we are trying to bring into that condition eventually. It is the thing for us to aim at.

But it is not a bad proposition to practice forestry even on the old plan of felling the timber only after a long period of years and then cutting it off clean. Brush land comes cheap, and if it does take long years to cover it with trees worth cutting for lumber, not much capital is thus left inactive, and not much care is necessary yearly, except at times that otherwise there would be nothing in the way of profitable employment in farming to occupy. Trees can be thinned out in winter and any time on off days. It is a good way of laying up money. Trees grow while we sleep. They grow faster than money in the savings bank, and there is no danger of defalcation or experiments in high finance.

Let the hills along the upper Housatonic valley become more and more barren and more and more of their top soil will run down every year until it is all gone, and the even flow that is natural to the forest-fed river gives to a succession of freshets and nothing between them. Remember, gentlemen, that in our manufacturing and mercantile establishments, with their call for packing boxes; our railroad industries, our building operations, large and small, Connecticut offers to her landholders a nearby and constant market for all the lumber they can produce. Here is the land, 1,000,000 acres, fit for this, and fit for nothing else. Here is the power in 1,000,000 population capable of turning it at small cost into profitable forests. Here is the market, right at hand, always with a short haul.



HON. SIMEON E. BALDWIN, GOVERNOR OF CONNECTICUT

IMPROVING FOREST FIRE PROTECTION

By M. B. Pratt

WINTER is the time largely devoted on National Forests to plans for the coming field season. The danger from fire past, the character of the duties of the Supervisor and Deputy Supervisor change from active, aggressive work in the field to a comparatively quiet, thoughtful time in the office. Relieved from the constant fire suspense, and his ears no longer continually tortured with the jangling telephone bell announcing fresh sorrows, the Supervisor can now think a few consecutive thoughts on one subject. The question of protection is naturally the most vital one. He reviews the past season's fire record in his mind, and in the light of added experience, dispassionately sees things that should have been done and things that it were better to have left undone. This may lead him to call a meeting of the ranger force to help him get down to essentials.

In a meeting recently held at Nevada City, the headquarters of the Tahoe National Forest, protective measures were discussed at length. Fire working plans had been made for the past season for each district by the office in conjunction with the district rangers, and one of the objects of the meeting was to find out how they could be improved upon. It was the general opinion that the plans were all right as far as they went, but that it would be much better for each district ranger to prepare his own plan, giving his idea of what he considered ideal protection for his district, regardless of cost.

In accordance with this idea a letter was sent out from the Supervisor's office to the district rangers asking them to submit ideal plans for their districts extending over a period of years. Attention was called to the circular written by District Forester Du Bois, entitled "National Forest Fire Protective Plans" in this connection. It was expressly stated that all views more efficient protection. The total area no matter how visionary in character, would be welcomed, since what might seem a vision now might be a reality in a short time, if the changes which have taken place the past few years are to be taken as a guide. It was further requested that each man submit a map illustrating his plan.

An outline accompanied the letter to serve as a guide in making the ideal plans. This asked for a brief history of past season's fires in each district; that all hazards such as railroads, sawmills, summer camps, stockmen, mines and towns, should be considered, especially old slashings; that improvements needed for ideal communication throughout the districts be specified; that the organization of patrols be described in detail; that the probable cooperation in fire fighting should be stated and that the cost of an ideal plan be named.

At the time set, ideal plans for the seven districts in the Forest were in the Supervisor's office. The task then was to mill them over and evolve a secondary fire working plan for the season, correlating as much as possible the administrative with the protective needs of the Forest.

A RETROSPECTIVE VIEW

In order to obtain a proper comprehension of what is being sought, the first step in the formation of a secondary plan is to look back over the past season's record. Using the areas burned over as a basis, it follows that the working plan for the season will be made to protect these localities and others similarly situated. The summary which follows served to get the plan under headway this winter:

"The area burned over on the Tahoe National Forest in 1911 was much less than the previous season due in part

to a more favorable season, but chiefly to the plans worked out in advance for of private and public land burned over was 3,900 acres as compared with 17,000 acres last year. Last year approximately thirty-five million feet of timber was destroyed valued at $70,000, this year 750,000 feet valued at $1,500. Last year 1.3 per cent of the total area of the Forest was burned over, this year .003 per cent. Our total number of fires this season was 69 as compared to 77 last season. Although we did not succeed in materially reducing the number of fires by more efficient protection yet we did succeed in greately reducing the area covered and consequent damage.

"We have learned that there is a zone of special fire danger on the west slope of the Sierra Nevadas which must be under constant surveillance during the fire season. In this zone fire spreads with great rapidity and rapid action is imperative. The portion of the Forest on the east slope does not cause so much concern. It is believed that the protective system now in force there needs very little adjustment to make it ideal in character. The plan, therefore, deals chiefly with the requirements in the special fire zone on the west slope which reaches to an elevation of about 5,500 feet. It is here that we want to spend the most of our money the coming season."

TABULATION OF DANGER SPOTS

Having taken a general survey of the situation it is next necessary to get down to details and locate the danger spots by districts. The ideal plans, of course, are very explicit in this regard. The secondary plan needs to be specific only as far as it is necessary to bring out spots for which protective measures must be devised.

First consideration is given to the areas traversed by railroads and traction engines. For instance it is noted that the Southern Pacific Railroad crosses the Forest from east to west and that trouble in the past has been experienced from fires along the right of way. The snow sheds on the west side of the summit of the Sierra Nevada Mountains are commanded by a railroad lookout man who could cooperate with Forest officials by reporting fires outside the railroad right of way.

It is noted in another district that tractions operated by a certain lumber company started three large fires the past season and caused the Forest Service considerable expense to keep them outside the Forest.

Sawmills are located by districts and the observation made that the mills in the districts on the west slope where danger from fire is the greatest, are small. Consequently, on account of frequent loose methods of operation, they are greater danger spots.

Construction and wood camps are recorded as well as the localities where greatest hazards exist from mines and settlers. Special emphasis is placed upon certain settlements as being the strongholds of "light burning" enthusiasts. Occasionally the areas were prepared for burning, but very often fires were set by settlers in brushy areas with little regard to the consequences. One culprit became so bold that he entered the ranger's camp who was trying to apprehend him and stole his provisions.

Under this head planting and experimental areas as well as localities containing heavy stands of government timber are considered. The greatest attention is paid to the location of old slashings which are considered to require the most intensive protection. This is especially true when they are located on the west slope within the fire danger zone before mentioned.

The relative importance of these danger areas is determined in the light of what happened the past season and is kept in mind continually until the method of control is finally worked out. To assist in this matter a large map is kept in the office on which is recorded by years all Class C fires since the Forest was established, as well as the slashings and chief danger spots. At the end of the fire season each year this map receives fresh ornamentation. It affords much food for reflection, besides serving as a source of inspiration.

DETERMINATION OF NEEDED IMPROVEMENTS

The relative danger of hazards being fixed in mind the next step is to determine how to spend the improvement allotment to secure maximum protection. A primary consideration is the extension of the telephone system already in existence. The ideal plan aims to secure such a method of telephone communication that every district can be readily reached from the main office, from the lookout points, and adjoining rangers and patrolmen. Consequently, it is a foregone conclusion that a good slice of the improvement allotment will be spent in this way each year until this result is achieved. For instance, it was recognized at the close of last season that the Foresthill district required better communication. The secondary plan accordingly summed up the matter in this way: "A telephone line is needed from Foresthill to Sugar Pine and Tadpole Ranger Stations, at least, and if possible to Robertson Flat and French Meadows. The total length of this line will be 39 miles. The idea of building this line is to prevent a recurrence of the disastrous fires of last summer, if possible, by getting quick communication with all available help."

Lookout towers are important factors to be considered in the protection scheme and wherever established they must be connected with the region they control by telephone lines. The Banner Lookout Tower near Nevada City was erected the spring of 1911 and demonstrated its usefulness in locating fires in a region which had fires in one locality when the patrolman was in another. Where it is demonstrated in an ideal plan that the riding patrol has a proposition of this kind to deal with, a stationary patrol, otherwise called a lookout man, is invaluable. This man acts in conjunction with the riding patrolman and an added precaution is thus given to areas particularly infested with slashings and light burning enthusiasts.

Trails next claim the attention as a subsidiary means of protection. The ideal plans give a large number of trails that should be constructed or brushed, and the direct bearing of this work on protection must be considered. The secondary plan picks out the ones which fit in best with the whole protective scheme. If it is seen that a trail can be constructed that will save the ranger several hours' ride in getting to an especially bad danger spot this piece of work will be considered before a trail which is recommended as a convenience to stockmen and tourists.

Cabins, barns and pastures must be provided at strategic points to serve as centres of the telephone and trail systems. The nature and cost of the houses to be built will depend upon whether they will be used as headquarters the year round or as stopping places for fire guards. The ideal plans are carefully scrutinized for all improvements needed to supplement the force which it is estimated can be put on the coming fire season. The direct or indirect bearing of every piece of proposed improvement on the whole scheme of protection is considered. The estimate of cost of each project is given in the ideal plans as well as the order in which the ranger considers it should be undertaken. The matter of improvements is directly correlated with the plans for the organization of patrol.

ORGANIZATION OF PATROL

The final decision on this extremely important part of the protective scheme can not be reached until the ideal plans have been gone over with a fine toothed comb. The ideal plans are more or less impracticable in some instances through the placing of undue emphasis on the protection of comparatively worthless areas, but the secondary plan must get down to bed rock and consider what is really worth intensive protection. A fire in the rocks and brush may be stubborn and cover considerable area but it will not do a fraction of the damage to the resources of the Forest that a small fire will do in a heavy stand of second growth pine or on a planting or experimental area which it has cost a lot of money to establish and

on which we are depending for data to shape future policy.

One ranger this year estimated that he needed eleven men, an automobile, six horses and a wagon to secure ideal protection in his district. This is very interesting and proves the ranger is a progressive, but necessity forbids that his ideas be incorporated at this time in a secondary fire-working plan. The estimate must be narrowed down to a practical basis and all Utopian schemes eliminated first of all. The process of reasoning as regards the number of men that can be employed is similar to that applied in figuring on the number of improvement projects that can be undertaken. Attention is given to the efficiency with which each particular district was guarded last year on the basis of its fire record. A tentative assignment of men on paper is then made over the entire Forest based on the fire hazards and facilities for co-operation. After this is done the sifting process of men between districts goes on until it reaches a point where it is considered that the best disposal of the funds available has been made. The Supervisor then correspondingly readjusts his estimate on improvements to fit the patrol organization.

The secondary plan next proceeds to outline the routes of patrol in each district in accordance with the number of men that can be assigned to that district. The station of each man is given as well as the route he will be expected to cover. The details of this matter are not considered in the plan, but are left to the judgment of the district ranger who is picked for his position on account of his administrative ability. His chief instructions are to the effect that he arrange to have some one available at the telephone during the fire season in case the Supervisor's office wants to get into quick communication with the district. He is, of course, expected to take charge of all serious fires in his district, but most of the patrol work will be done by his assistants.

After the Supervisor has gotten the matter of men and improvements sifted down to what he considers the last analysis he still finds that he is going to have parts of his Forest more or less unprotected. This prompts him to seek cooperation among the various interests on the Forest, and he closes his fire plan by urging the rangers to work along this line and organize fire brigades in different parts of their districts as well as make arrangements for having supplies on hand in emergency cases.

Having threshed out the ideal plans and embodied all that he thinks will work during the coming season in his secondary fire plan, the Supervisor sends it down to the District Forester with an itemized cost sheet. If he is lucky, he may get what he asks for, but the chances are that he must be content with less and that his fire plan will have to undergo further readjustment. He has it in such a shape, however, that he can easily make the necessary changes.

By this time the fire season has opened and with his fingers on the pawns he plays many games of chess all summer in his efforts to checkmate his grim adversary which, like its crafty master Mephistopheles, is fond of appearing unawares and in different guises to the innocent.

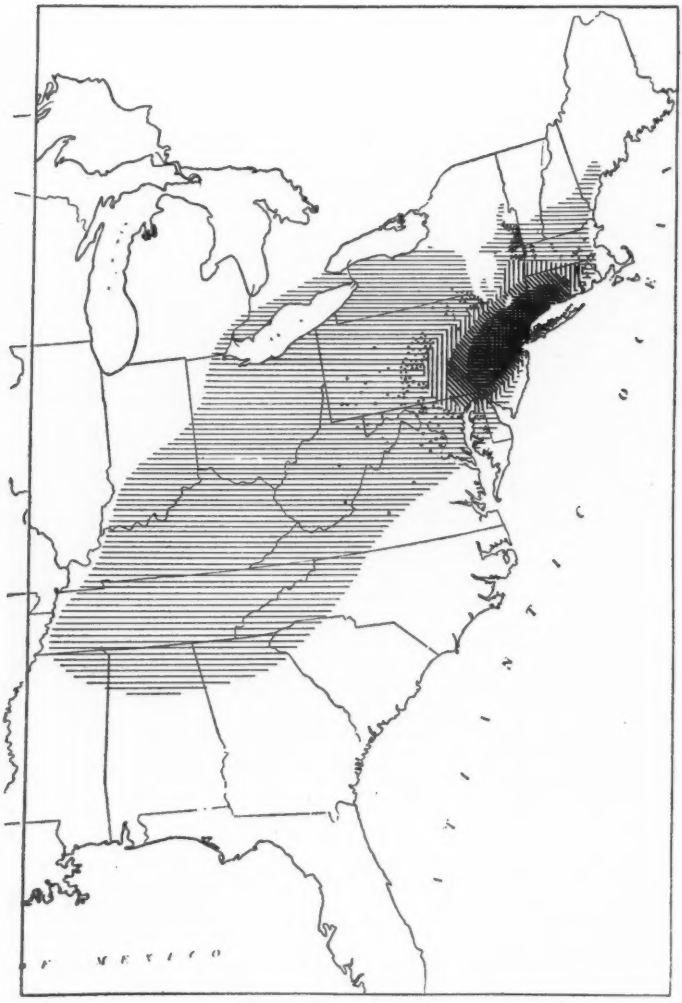
An educational effort is being made through the forestry department of the University of Georgia to increase the timber supply of the South by reforestation. The department points out that cherry among other trees admirably adapted to the soils of the Appalachians; that the black walnut grows readily on the Cumberland plateau, and that other trees find particular areas of the South exactly suited to their growth. The Georgia department of agriculture is also interested in the subject of reforestation.

A FAMOUS OLD TREE

THE vitality and tenacity of life in a tree are remarkable. A tree will endure almost any sort of treatment. Its life is endangered only by the destruction of the heart-wood. So long as the vital fluid, the sap, is able to circulate through the tree, it is vigorous.

A notable instance of this is the famous Liberty Tulip Poplar, which stands on the campus of St. John's College, Annapolis, in front of the main building. Through the agency of Dr. Fell, the President, who is an authority on many scientific subjects this tree was "doctored." This Tulip-Poplar first met with severe treatment when, in 1840, some iniquitous boys placed gunpowder in the hollow trunk of the tree. The powder exploded. Immediately the tree was ablaze. A throng of citizens rushed to the scene and deluged it with water. The explosion was not so disastrous to the tree as was first expected—rather a benefit, for it destroyed the germs which were propagating in the fungus. There was a new lease of life. The following spring showed an abundance of foliage on the branches. In 1860, a second wound was made by the falling of an old branch. This was during the Civil War when the Union men were encamped on the College Campus. It fell between two tents without loss of life or injury to anyone.

Through artificial means, the usefulness of the tree has been prolonged by giving it support to make it rigid. This support has been given through filling the tree with fifty tons of cement. The base was made broader than the upper part. Iron rods were run through the cement and these bind the parts together. Into the huge branches, which were hollow, iron rods were also run. Cement was inserted here as in the trunk. This inner filling gives strength and enables the tree to sustain itself. There is no strain whatever on the tree. The idea of the cement is to make an air and water-tight plug, which prevents growth of fungus. The fungus growth, which destroyed the heart of the old tree, was thus eliminated. This tree, two feet from the ground, measures twenty-nine feet and four inches in circumference. It stands about one hundred and fifty-one feet high. Although the trunk is a mere shell, the tree seems to flourish, having thousands of blossoms on the branches every year. This wonderful tree stands preeminent among all others as a symbol of constancy, perpetuating beauty and victory. It is pictured on the canvas of the past as rich in memories. It stands as a tower of strength at the post of duty. The Red Men gathered under its green canopy of spreading branches for council. Beneath it they sat to smoke the pipe of peace or listen to the words of the chief, who with dignified countenance and calm demeanor impressed his tribe with wonderful authority. At length, he told them of a treaty to be made with the Pale Faces from the far-off land across the Great Water. They little realized that in signing away their rights, they were permitting a new nation to take root and that no longer would they be permitted to commune beneath those stately branches. History records the particulars of an assembly of advocates of freedom among the colonists under this noted tree. There they discussed the cause and their attitude toward the men not in sympathy with the movement—whether they should be punished or not. In 1825, a prominent personage, conspicuous in history, General La Fayette, was entertained at Annapolis under this tree.



From Science

THE DISTRIBUTION OF THE CHESTNUT BARK DISEASE

NOTES ON GERMAN FORESTRY

By Prof. W. R. Lazenby

A RARE opportunity to observe the forests, and to learn something of the German forest policy prompts me to write a few things concerning the German forests and their forest policy, which may be of interest to the forestry men of the United States. In the first place it should be understood that the German Empire in its federal capacity has nothing whatever to do with the forests. The control of the forests is exclusively in the hands of the various states, who in their confederation form what we know as the nation called Germany. Each state government directs the forestry policy of its own state and the national government has never interfered in any way with this procedure. We should not forget that the relation between the German states and the German Empire is exactly the same or analogous to the relation existing between our American states and our Union. In our country, however, the federal government has done much more to develop forestry than has so far been done by any of the state governments or state activity.

The first general forestry movement began about 1750. At this time the population began rapidly to increase, most of the agricultural land had been cleared of timber, there was no coal, and no means of transportation of wood from the mountain forests. A succession of winters unusually severe caused much discomfort and suffering, and the people awoke to the importance of a fuel famine.

RAPID FORESTRY DEVELOPMENT

From this time forestry developed with great rapidity. Everybody was interested because everyone needed fuel. Within the next 25 years most of the leading state governments had formulated some forest policy, the principal features being an effort to secure a continuously substantial yield of wood and timber from all state forests. That is, no more wood should be cut than was produced in the same year; or in other words only the annual increment should be cut. After a time and with the advent of better means of transportation, the fear of a wood famine passed away, but the idea and practice of conservative forestry had taken such a deep hold upon the public mind that the development of a sane and rational forestry policy met with little or no opposition.

It is well known that trees, especially of the evergreen class, can be grown on soil that is too poor for agriculture, and the artificially planted forests on either rocky or on poor barren sandy lands that were unfit for remunerative farming. Each German state has three classes of forests. First those owned by the states themselves; second those owned by the cities or small communities; third those owned by private individuals. Most of the communial and private forests are regulated by the state, that is to some degree at least. One of the important restrictions is that no private owner or community can cut more than is produced and that all deforested land must be reforested.

One of the largest state forests is that of the Spessart mountains in Bavaria. This forest is composed very largely of white oak, which is said to be the finest in the world. Owing to its slow growth it is very fine and even in texture and yields veneer logs for which extravagant prices are paid. The average price of first class logs in the woods, many miles from the railway is something over $250 per thousand board feet. While the choicest logs sell for more than double this price. Not a few of these old oaks have a value exceeding $1000 each and they are only cut when it is evident that they have attained their highest value. The white oak of this district is as famous

throughout Europe as the white oak is famous in America.

EASY METHOD OF PLANTING

The city forests of Darmstadt in Hessen are composed largely of pine and beech. The oldest stands of pine were started over 100 years ago, by simply scattering pine cones upon the ground and driving large flocks of sheep over them. By this means the seed were pressed into the ground and a fair stand of seedlings resulted by using this cheap and easy method.

Especially fine are the stands of pine in the pole stage, that is of size fit for telegraph poles. These trees are 50 years old and were raised from more carefully planted seeds. They have long, clean, straight trunks, and the largest specimens are being removed so as to give a better chance to those that are left.

The youngest stands are for the most part transplanted seedlings, which were planted at the rate from ten to fifteen thousand per acre. The cost of planting is not a great item for the two-year-old seedlings can be raised at an expense of from ten to twenty cents a thousand and the labor of outplanting is from fifty to seventy-five cents a day.

The German forest policy aims to reforest all waste lands, and to gradually increase the forest area, under direct state control. It aims to improve the education and training of foresters and rangers at the expense of the state, and is seeking to extend fire and other forms of protection over all forest land. Another feature is to encourage the largest public use of all forests as a means of health, recreation and enjoyment for all the people.

Native American evergreens and softwoods are being planted here on a large scale. Among them the white pine and Douglas fir are the favorites on the better soils, while pitch pine and Jack pines are planted on the poor, sandy soils. Last summer was one of unprecedented heat and drouth and this caused the death of many young stands of introduced species, while the natives suffered comparatively slight losses, and this emphasizes the greater vitality of the latter.

Among the introduced deciduous trees the American red oak seems to be the one that is favorably regarded.

The financial success of German forestry depends mainly on two factors: First, good means of transportation; and second, that the owners, whether they be state, city or private, refuse absolutely to sell more than a small annual percentage of the stand. By doing this the market is never overstocked, for the demand is always greater than the supply, and the price received is much greater than the cost of production, including the interest on the money invested at compound rates.

The American foresters and timberland owners can learn many things from the German foresters along many lines, and many mistakes that might be made in their work can be avoided by the study of the European methods.

The state forests of Bavaria comprise 2,150,000 *acres. Thirty-three per cent of the entire area of the country is covered with forest. Of these trees 77 per cent. are coniferous. The average estimated value of the forest land is* $50 *per acre. The annual aggregate expense of administering the forests, including salaries of officials, wages of workingmen, local taxation, new purchases, etc., amounts to* $4,965,204. *The total revenue from the forests the same year amounted to* $8,187,349.

A NATIONAL EXPOSITION ON CONSERVATION

AN exposition of national scope, the purpose of which is to promote the conservation of our natural resources, is to open in Knoxville, Tennessee, in September, 1913. It is to be known as The National Conservation Exposition, and while it is to be open to all parts of the country, its special field will be the development of the Southern States. An Advisory Board of leaders in the various branches of conservation work, with Gifford Pinchot at its head, has been formed as part of the Exposition Company's organization, and is now at work formulating detailed plans for the exhibits. Each department of Conservation is represented on this board by one or more experts in that line.

The members of the board and the particular work assigned to each are as follows: Gifford Pinchot, President of the National Conservation Association, Chairman of the board and in charge of general conservation and forestry; Don Carlos Ellis, Secretary of the board, forest conservation; J. A. Holmes, Director of the Bureau of Mines, conservation of minerals and the protection of human life in mining operations; Bradford Knapp, in charge of the Farmers' Cooperative Demonstration Work of the Department of Agriculture, scientific agriculture and the conservation of soils; W. J. McGee, Soil Water Expert of the Bureau of Soils, Department of Agriculture, conservation of soils; Logan W. Page, Director, Office of Public Roads, good roads; Joseph E. Ransdell, Representative and Senator-elect from Louisiana, the development of waterways; P. P. Claxton, U. S. Commissioner of Education, the work of education; Dr. Harvey W. Wiley, former chief chemist of the United States, the conservation of public health; Senator Duncan U. Fletcher of Florida, President of the Southern Commercial Congress, southern development; Senator Luke Lea, of Tennessee, general conservation.

Two other members are to be added to the board to represent country life improvement, domestic economy, and child welfare.

An exposition company has been organized and drafts have been made of a charter for a capital stock of one million dollars. The company has taken over the plant and all property of the Appalachian Exposition, which has been held at Knoxville for the two past years. This plant contains a park of one hundred acres, two artificial lakes and several excellent exposition buildings, among which is a Forestry and Mineral Building. A Southern States Building is to be erected to contain exhibits from all the Southern States which participate. An Agricultural and Land Building is also among the new structures planned. A special feature of this building will be an immense bas-relief map of the Southeast, 200 feet long, upon which the principal resources of the States represented will be displayed. As an annex to this building, will be a long auditorium for assemblies, such as the National Conservation Congress, the National Breeders' Association, and Good Roads and Waterway Improvement Conventions.

Knoxville was awarded the location of the exposition because of its splendid location in the midst of the Southern Appalachian Region and in the midst of a very rich section of the South, and because of its preparedness in having the Appalachian Exposition Plant.

The officers of the exposition are: President, William S. Shields, president of the City National Bank of Knoxville; first vice-president, J. Allen Smith, president of the Knoxville City Mills; second vice-president, Don Carlos Ellis; third vice-president, George W. Callahan, president of the Callahan Construction Company; fourth vice-president, H. M. Johnston, president of the Union Bank of Knoxville; treasurer, S. V. Carter, cashier, East Tennessee National Bank; general manager, W. M. Goodman, secretary, Knoxville Commercial Club.

OPPOSE STATE CONTROL OF FORESTS

MEMBERS of the Colorado State Forestry Association, of which W. G. M. Stone is the president, are vigorously combating a move to turn over to the State the public domain and all its natural resources. Such a change would embrace the forest reserves and if these passed into private ownership, as some desire, it would unquestionably lead to conditions involving the extermination of the forests which conserve the snows and moisture at the headwaters of the state's mountain streams.

The Association now declares that whatever changes in the Land laws may be necessary in other directions, that it most earnestly protests against the turning over to the state of that portion of the public domain which includes the forest reserves.

The Association says: "To turn the forests over to the state; for the state to open them up to indiscriminate and easy entry; letting in sawmills, tie cutters, and others in countless numbers, to get the forest products on the market; the building of thousands of cabins necessary to shelter such an army of mountaineers, and the providing of food and clothing for so great a number would, without question, add greatly to the activities of the state—for a time, but—

"When the mountains are stripped and there is no more timber to put on the market:

"When the irrigated lands on the plains begin to feel the effects upon the water supply by reason of the deforestation of the mountains:

"When it is found that no further irrigation development by the storage of water is possible:

"When all further growth of our agriculture in this direction is at an end:

"When the so called mountain homes are deserted and the lands are sold for taxes with no buyers except the respective counties, what then? A blight. A set back from which there could be no recovery. A set back by the same cause that brought desolation and ruin upon Northern Africa, Syria and Babylonia, once cradles of learning and homes of the world's best progress."

The resolutions passed by the Association heartily endorse the policy being pursued by the Forest Service, which is opposed to turning over the forest reserves to the state, and pledges it support in its undertaking to protect the forests and improve their greatly dilapidated condition.

APPROVE A NATIONAL FOREST

AT a recent meeting of the District of Columbia Branch of the Woman's National Rivers and Harbors Congress a subject under discussion was the advisibility of a national forest as a background and worthy setting for the Capital, with its classic buildings rising in stately splendor. The tract of land in view, which would be included in the proposed national forest, begins at Bladenburg and extends northeast twenty miles, until it crosses the Patuxent River. The speaker said: "In all this tract includes about 41,000 acres. Separated from it by a narrow strip between Washington and Laurel, there is another body of 16,000 acres. Beyond the Patuxent it swings eastward, touching the Severn and South rivers and reaching the outskirts of Annapolis, the seat of the United States Naval Academy, and thereby adds another area of 43,000 acres. Another forest district of vital

importance to the nation's capital, containing some grand scenery which should be included in the purchase, borders the banks of the Potomac River from the District Line to a point beyond the Great Falls, an area of 10,000 acres. All of this is a region unsurpassed in natural beauty and wealth of vegetation. Sixty-five varieties of trees can be found upon it. It can be used for practical and scientific demonstration and will therefore be as useful as it will be ornamental."

The following were present: Mrs. Andrews, chairman of the committee on education; Mrs. Randolph Keim, Mrs. Herbert Knox Smith, Mrs. F. H. Newell, Mrs. Ballow, member from Hawaii; Mrs. A. P. Davis, Mrs. L. A. Williams, Mrs. M. P. Keith, Mrs. J. H. Shepperd, Mrs. I. W. Ball, Mrs. C. A. Miner, Mrs. Earnest L. Miner, Mrs. Richard B. Chew, Mrs. Clemons, Mrs. H. Compton, Mrs. A. E. Murphy, Mrs. J. E. Gadsby.

NEWS AND NOTES

Flood and Forests

An object lesson and a very startling one of the value of forest conservation has been shown along the Mississippi river. The flood tide now sweeping through the lower valley of the Mississippi is inundating towns, paralyzing business, destroying argicultural prospects and causing property losses which will probably aggregate millions, not to speak of the loss of human life.

We have often spoken of the necessity of the forests to human safety and progress and the present destruction by flood in the Mississippi valley once more shows the imperativeness of forest conservation. The reports demonstrate that the calamity is largely due to the misbehaviour of the Ohio river from which raging torrents are pouring into the Mississippi. The states bordering the Ohio have not preserved their forests and now as the water accumulates from rains and from the spring thaws it is not held in check in the forests until absorbed by the earth. The forests that served as checks have gone and the pools unite and form rivulets and streams, gradually growing in size. They seek an outlet and find it, in the present instance to the great destruction of property, later loss resulting from the lack of storage and consequent shortage of water when needed to furnish the motive power for the wheels of industry.

The $80,000 Appropriation

Prevention of the chestnut tree blight was discussed before the House Committee on agriculture on April 11, and the passage of Representative Moore's bill, appropriating $80,000 for the purpose, as advocated by the American Forestry Association was urged by prominent men from Pennsylvania, New York and elsewhere. Representative Moore, who opened the discussion, said that the losses, due to the blight, had already reached $25,000,000.

Harold Pierce, of Ardmore, secretary of the chestnut tree blight commission of Pennsylvania, told what Pennsylvania had done to protect trees in its own jurisdiction, and urged government aid to prevent the spread of the fungus elsewhere. Among other speakers were Deputy Forestry Commissioner I. C. Williams, of Pennsylvania; John Foley, forester of the Pennsylvania Railroad; H. W. Markel, plant pathologist, Bronx Park, N. Y., who is credited with having discovered the disease, and J. S. Holmes, State forester and geologist, North Carolina.

Forestry Conference Plan

At a meeting in Albany, New York, on April 10, of representatives of various State departments and educational institutions interested in forestry problems and work, the New York State conference of conservation of forest resources was formed on motion of Professor Walter Mulford, of Cornell University. State Superintendent of Forests C. R. Pettis was elected secretary.

The conferees agreed upon a comprehensive plan of State-wide activity for the reforestation and preservation of the forests of this State, together with the utilization of vast areas of soil now idle. Various committees were appointed to carry out this plan.

Killing the Bugs

A tubular gasoline torch designed especially for killing insect pests which damage trees and growing crops has been perfected by the Twiner Brass Works, of Sycamore, Ill. It produces a flame sufficiently large to cut off the supply of oxygen or air, which is essential to animal life, also enough heat to destroy the animal organism. This new

method has been found very effective and has been endorsed by many authorities of agriculture and horticulture. The habits of many insects have been studied and means have been found for trapping them as easily as catching rats and mice and they can be much more easily killed by means of this new torch.

This is especially true of the chinch bug which can be snared in passing from the wheat to the green corn when the wheat is being cut. This torch can also be used very effectively for destroying the eggs, larvae, etc., beneath the surface of the ground.

White Mountain Reserves

There has been sent to the Forest Reservation Commission at Washington by the Boston Chamber of Commerce a memorial adopted by the latter, requesting that the Nation may acquire by eminent domain within the fiscal year ending June 30, certain lands in the White Mountains.

At present the Forest Service has options on about 75,000 acres of land in this mountain tract. This stretch may be increased to 90,000, and the whole purchased for a National forest in the White Mountains, providing the geological survey reports favorably within the given time.

That the purchase may be made seems probable in view of the recent favorable report of the Forest Service on some lands in the Southern Appalachians and the statement issued by them that they "hope to make a favorable report" on this district also.

Reforesting Pike's Peak

The Government has started work reforesting the north slope of Pike's Peak. The improvements proposed will cost about $100,000, although the work planned for this wear will take only about one-tenth of that appropriation. It will require about 10 years to complete the work.

The work outlined for this spring will cover a period of about two months. About 100,000 trees, including the Douglas fir, Englemann's spruce and the yellow pine, are to be replanted. Seeds from the same trees will be planted over about 1,000 acres.

The area which will be planted to seed and young trees is at the headwaters of Cascade creek, about three and one-half miles from Cascade. The Government has closed the work of planting seed on snow in an adjoining area of about 500 acres.

STATE NEWS

Washington

Twenty lumbermen, representing corporations and individuals owning timber worth many millions, and a half dozen state and government foresters, from California, Oregon, Washington, Idaho and Montana, met recently in Spokane for the annual business session of the Western Forestry and Conservation Association. Plans were outlined for the protection of the western forests against fire next summer. E. T. Allen, forester of the association explained to the members that under the Weeks' law creating the Appalachian forest reserve, all states protecting forests at the head of navigable streams are entitled to claim up to this amount from the government. Only the application is necessary.

"Oregon already has availed itself of this privilege," said Forester Allen. "There is no reason why the other four states of the association should not have their share. The Federal government appropriates the money on the condition that the state appropriates an equal amount to be used in protecting the sources of navigable streams. Money for this purpose, in excess of $10,000, is already appropriated by each of the states named. There is, therefore, no reason why the government aid should not also be secured."

Wisconsin

How Arbor day and Bird day and Fire Prevention day may help reduce the high cost of living is the lesson sought to be brought home to school children and others in the Arbor day annual issued by the Wisconsin State Department of Public Instruction. The annual is for the first time joined with the fire prevention cause.

"If we knew the amount savable annually by a wise forestry policy in reducing the cost of wood as a raw material in manufacturing industries," says the editor, "in lessening the cost of water power, and in lowering transportation charges on bulky commodities; if we knew the amount of annual loss to agriculture by insect pests which will be prevented by protection of bird life, and if we then were able to add to these amounts the $200,000,000 of preventable fire loss, we should have a total annual saving of certainly not less than $1,000,000,000, and possibly several times that amount.

"If this saving were equitably distributed there would be a substantial reduction in the cost of living for all."

Massachusetts

In Massachusetts negotations have been carried on for some weeks between State Forester Rane and the State Department of Agriculture and the Government postal authorities in Washington with the result that the mail carriers of that State employed in the rural service will receive instructions as to their duties within a short time.

The plan suggested by the State Forester of Massachusetts and the one which has been ordered by the United States Government is to be put in operation, is that all rural mail carriers in Massachusetts be required to report any forest fires that they may discover while traveling over their routes to the forest warden or deputy warden residing nearest the fire.

In that State the average length of the rural mail routes is about 20 miles, and there are 300 rural mail carriers in the service, which through the adoption of this method, creates an auxiliary patrol service over 6,000 miles of country roads.

Maine

A recent item in the Bangor Commercial of Maine states that Land Commissioner Mace has just turned into the treasury of that State $18,252.52, received for the sale of stumpage and rentals from the reserved school lands of the plantations and townships. It appears that the State of Maine has wisely retained control of sixty-nine different tracts of a thousand acres each in as many unorganized sections of the State, the timber land to be available for school purposes as soon as the townships are settled.

Oregon

Governor West has received copies of a bill which has been introduced in the Senate by Senator Chamberlain providing for the State to create a state forest through exchange of scattered school sections in Federal forests for a compact body of forest reserve lands. In substance, the bill makes the following provisions:

"That where any state or territory owns lands lying within the boundaries of a National forest, or where its right of indemnity selection in respect to school sections within such boundaries has not been fully exercised, said state or territory is hereby authorized, subject to the approval of the Secretary of Agriculture, to exchange such lands for or make indemnity selections of other National forest lands of like quantity and value; the same to be selected in reasonably compact bodies, which lands shall thereon be excluded from the National forests for the benefit of said state or territory.

"Provided, that in fixing the value of state school sections offered in exchange the Secretary of Agriculture shall take into consideration the value of such lands to the State by reason of their being available and salable for script or base for indemnity selections."

California

Articles of incorporation for the California Forest Protective Association, a non-profit, co-operative corporation, have been filed in the office of Secretary of State Jordan. The purpose of the organization is the co-operation between forest land owners, Government and State authorities, for the better protection of California's wooded lands. The principal offices of the association are to be at San Francisco, and the fifteen directors, all of San Francisco, are the following:

Miles Standish, S. D. Johnson, R. W. Landon, C. R. Johnson, H. G. Lawrence, C. C. Smith, E. F. Metlan, M. L. Euphiat, R. T. Buzard, C. E. Kimbal, O. C. Haslett, C. A. Strong, L. O. Van Brundt, M. W. McIntosh, W. B. Weston.

Utah

District Forester E. A. Sherman reports forest conditions favorable in all sections of the country embraced in his district. The prospects for the season regarding range conditions, timber growth and protection, including the installation of fire-fighting apparatus, have never been brighter, and it is expected that better results will be obtained this year than in previous years.

Meetings of rangers and supervisors have been held in all parts of the district and the men from the field say the department could not well ask for better conditions. The watersheds are being protected better than ever before and the ranges have so improved in the past few years that stockmen are rejoicing over the abundance of grass and good water supply.

It is stated by the foresters that in districts where floods were frequent a few years ago, overflows are now almost unknown, the saving of life and property being almost beyond calculation. The preservation of trees and underbrush on the mountain sides and in the canyons has been the means of holding the snow longer in place and the flow of water in the springtime has not been so rapid as when the mountains were bare.

North Carolina

The Appalachian Forestry Reserve Commission has purchased 21,000 acres of woodland in Macon County at a cost of $200,000.

The land was the property of the Macon County Lumber Company, which had cut a large portion of the lumber from it in the past ten years.

The immense tract which is now practically depleted of lumber will lie untouched for the most part for a number of years, as a forest reserve, while young trees which are now growing and which will be planted by

the Government, are allowed to reach timber size.

Idaho

Seeds from 20,000 bushels of white pine cones, recently gathered on the Kaniksu national forest reserve, in Northern Idaho, will be planted on the Coeur d'Alene, St. Joe, Lolo and Cabinet forests in districts swept by fire in the summer of 1910.

A seed extracting mill is being installed by the Government at the Falls Ranger station, and it is expected to secure 14,000 pounds of seed at a cost of about $1 a pound.

Henry H. Farquhar, chief of planting of the United States Forest Service, who is in Spokane, reports that the cones were collected entirely from the squirrel caches. Operations were spread over a territory 22 miles in length and five miles in width, 100 men being located in four camps, each with two cooks and a camp foreman.

The men were paid by the day, with a bonus if they averaged a certain number of sacks each day. Several collected more than 10 two-bushel sacks a day during the 30 days they were at work.

Pennsylvania

The Sharpsville, Pa., station of the Baltimore & Ohio Railroad is being cited as evidence that some of the so-called "soulless corporations" are not so soulless after all. At Sharpsville the railroad company purchased extra land for tracks and a station in order to allow two beautiful specimens of the silver leaf maple tree to keep on growing on the right of way, although by chopping them down many hundreds of dollars would have been saved.

When the engineers ran their lines into town the plans called for the tracks to be laid over the ground now occupied by the trees. Then some of the officers of the company inspected the route and discovered the trees, and some lovers of trees made pleas for the preservation of the trees.

The pleas were heeded and the engineers had to run new lines and make plans for a curved track in order that the trees might stand undisturbed.

A similar condition cannot be found throughout the country, according to travelling men. It is not uncommon for strangers to stop and wonder at the sight of the trees growing between railroad tracks.

Michigan

In his report to the directors of the Northern Forest Protective Association, Chief Forester Thomas B. Wyman, of Michigan, said that the total loss suffered last year on lands over which the patrol existed was less than $6,000. Many fires were extinguished in their incipiency.

There are nineteen wardens in the service of the association, and it was decided at the annual meeting to provide mounts for these men. The mounted forest rangers of the upper peninsula may, therefore, be expected to become picturesque figures.

It was the intention of the directors to raise the tax levy to seven-eights of a cent an acre, in order to enlarge the scope of the work of protecting the forests against fires, but it developed that the increase of acreage expected the coming year will afford sufficient funds at the old rate of five-eights of a cent an acre. The committee, however, reserves the right of calling further assessments in case the season should be particularly dry and necessitates additional precautions.

Massachusetts

The chestnut blight which has made its appearance in Massachusetts, has resulted in the placing on the market of considerable standing chestnut timber which, will become affected unless it is cut and used. The State owns as a reserve what is known as "Squaw peak" on Monument Mountain, and the State officials have decided that it is the advantage of the State to dispose of the standing chestnut that is on this reserve, and a number of contractors have been figuring on certain sections of it. There is quite a large quantity of chestnut timber on the mountain and most of it will probably be cut off. Individual owners are also becoming alarmed on account of the blight, and it is probable that considerable chestnut timber that has been held for a number of years will be disposed of within a short time.

New Hampshire

In the interest of further promoting forestry in the State of New Hampshire, the State Forest Commission have just issued an interesting circular, together with information that such tree-planted land will be subject to a tax rebate of 90 per cent the first 10 years, 80 per cent the next 10 years, and 50 per cent for the third period of 10 years.

Nearly every farmer or large land owner has some unproductive land on which he is paying taxes and getting no return. Such land, if planted to trees, will increase in value rapidly. Moreover, forest-planting in this region is no longer in the experimental stage. Enough plantations have been made to demonstrate the success of planting certain kinds of trees, and experience has developed cheap methods of planting. In the spring of 1911 the Forestry Commission distributed 230,000 trees. Reports made by the owners indicate that about eighty per cent of these trees survived the extreme drought of last summer and are growing well.

New Jersey

The New Jersey State Forest Commission

has been notified that the Postmaster-General has decided to order rural mail carriers to keep watch for forest fires and when one is seen to send word to the nearest fire warden.

This order is the outcome of a plan first proposed by the State Fire warden and taken up by him with the Post Office Department through the United States Forest Service at Washington, and is a further endorsement of the effort the Forest Commission is making to provide protection to the woodlands of the State.

Under the scheme, each rural mail carrier will be furnished from Trenton with a list of the fire wardens in the territory through which his route runs. Also every fire warden will be notified of the arrangement and instructed to find out which carriers work in or near his district and let them know where he can be reached and how word may be gotten to him in the easiest and quickest way.

The United States Secretary of Agriculture has notified the Commission that the fund allotted to New Jersey for forest fire patrol in 1911, viz. $1,000, will be doubled for 1912, making the amount $2,000.

EDUCATIONAL

The Biltmore Class

Members of the Biltmore Forest School class who recently returned from Europe and spent a week in Washington, together with the alumni of the school in the various branches of the Forest Service, gave an informal smoker on Wednesday, April 17, at a Washington hotel. Besides the alumni and members of the class a number of prominent men were present.

After a most profitable instructive and interesting six months in Germany the class of thirty-five under the tutelage of Dr. C. A. Schenck returned at the end of March and then spent two weeks at Tupper Lake in the Adirondacks. From Washington they went to Newburn, S. C., and from there they go to Sunburst, near Asheville, and on to Cadillac, Mich., where they will spend the greater part of the summer. From there they go to Oregon, later returning East by way of Texas and Louisiana.

New Head for Forest School

Professor William Darrow Clark has been selected to fill the vacancy, due to the resignation of Dr. Hugh P. Baker, at "Penn State" Forest School. Professor Clark is especially qualified to succeed as head of this important Forest School and we prophesy a continuation of the success which the school has achieved in the past. Professor Clark is a graduate of the Yale Forest School, Class of '09, and has served an apprenticeship in the United States Forest Service. In September of 1909 he accepted an appointment as Assistant Professor of Forestry in the "Penn State" Forest School, where he has demonstrated his worth as teacher and executive. Kind and generous, yet with a keen sense of right and justice, he is a favorite with faculty and students alike, holding the respect and esteem of all.

With the change in her curriculum, the "Penn State" Forest School offers a four year undergraduate course unsurpassed in the United States. Following the Sophomore year the students are given two months of field work on a 20,000-acre tract of virgin white pine in the western part of the State. Here are taken up the subjects of Mensuration, Surveying, Silviculture and Systematic Botany. A large mill in the immediate neighborhood offers opportunity for studies in mill scale and simliar work. Following the Junior year the students are given an opportunity to spend a summer in the Forest Service or in the Forestry Department of one of the several States. In addition to this practical experience, the entire second semester of the Senior year is spent in the woods of the South and every facility is offered for a broad and comprehensive study of Lumbering and Management. This makes a total of about ten months practical work during the four-year course, sufficient time for a perfect correlation of theory and practice.

There are more than one hundred and fifty students enrolled in the forestry course and the present graduating class numbers thirty. Many of these men hope to enter the Forest Service, but an equal number are planning on private work in forestry; as timber estimators, woods agents, railroad foresters, park superintendents, and city foresters.

A New Ranger Course

The Department of Forestry of Colorado College (Colorado School of Forestry), announces that it will establish a one-year ranger course next fall. The purpose of this course is to give practical instruction to rangers or to those interested in ranger work. Such a course should ultimately improve greatly the efficiency of the ranger force on the National Forests. Engineering, estimating, silviculture, mensuration, grazing, and fire protection will be emphasized and there will be instruction in other subjects of practical usefulness in the Rocky Mountain Region. The course will be conducted

largely in the field—from September 10 to December 1, and from April 1 to June 28, on the College Reserve at Manitou Park. From December 1 to April 1, the course will be conducted at Colorado Springs.

The installation of this course is the result of the success of the ten-weeks ranger course given last winter.

At the same time the proportion of field work in the regular two-year technical course is to be greatly increased. The students will be at Manitou Park the same time as the rangers.

Ranger Course Closes

The students of the first ranger school finished their work in the department of Forestry at the University of Idaho on Friday, March 8. Thirteen students registered for this course, two of whom are already employed as rangers in the Forest Service; two others have decided to remain in the forest school and complete the entire four-year course. The others will endeavor to secure employment in forestry work during the summer and either return to pursue additional forestry courses in the autumn or take the rangers examinations and enter the Government Service permanently.

Mr. Start's Position

Edwin A. Start, for three years past the secretary of the American Forestry Association, has gone to Seattle, where he became the director of the university extension work in the University of Washington. Mr. Start has done notable service in the forestry association for nearly ten years, having been secretary of the Massachusetts association before taking up the larger post. The position in the Northwest is a large one, the university having 3,000 students and having grown the last ten years with great speed. It is interesting that it was begun when the city had only one hundred and forty-nine inhabitants.

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Plans have been completed for the annual meeting of the National Lumber Manufacturers' Association at Cincinnati on May 7 and 8, and a number of prominent speakers will read papers and make addresses on subjects of importance.

At the twenty-sixth annual meeting of the Lumbermen's Exchange of Philadelphia, W. T. Betts was elected president; Benjamin Stooker, vice-president; Charles P. Maule, treasurer.

John Muir recently found in the forests of Brazil along the Parana a large number of araucarias, called by the natives Brazilian pine, and growing 120 feet tall. The foliage of the trees was in bunches at the tops. The spines on the trees prevent the monkeys from climbing them and they are called "monkey puzzles."

A final warning in regard to the pine beetle has been issued by Dr. A. D. Hopkins, of the United States Bureau of Entomology, who announces that infested trees may safely be destroyed until May 1, but that after that time felling of live or dead pine timber will only aggravate the ravages of the pine beetle.